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Research Articles

Frequency of Hepatitis B surface antigen (HBsAg) and Hepatitis C antibody (HCVAb) seropositivity among preoperative eye surgery patients Mahesh Kumar Lohano, Li Su, Ashok Kumar Narsani, Muhammad Jawed & Hameem Naveed	5
Review Articles	
Pharmacological and Non-Pharmacological Interventions for Persistent Auditory Hallucinations in Schizophrenia James Paul Pandarakalam	9
Ventilator-associated pneumonia: A review of the clinically relevant challenges in diagnosis and prevention Varun Goel, Savita Gupta and Tarun Goel	18
Case Reports/Series	
Tuberculosis presenting as Costochondritis: a rare case report and brief review of literature Manzoor Ahmad Wani, Naveed Nazir Shah, Syed Quibtiya Khursheed, Khurshid Ahmad Dar, and Asma Bashir	26
Clinical Practice	
Musculoskeletal training in Rheumatology - What the trainees think Kavitha Nadesalingam, Eleana Ntatsaki, Dobrina Hull & Rod Hughes	29
Education and Training	
How to Run a Mock CASC Heather Welsh	32
SPA days for all trainees? Alexander Hall and Joanna Spence	36
Improving Communication Skills Using Simulation Training Priya Subramanian and Krishanthi Sathanandan	39
Miscellaneous	
Adaptation Practice: Teaching doctors how to cope with stress, anxiety and depression by developing resilience Clive Sherlock & Chris John	42

Frequency of Hepatitis B surface antigen (HBsAg) and Hepatitis C antibody (HCVAb) seropositivity among preoperative eye surgery patients

Mahesh Kumar Lohano, Li Su, Ashok Kumar Narsani, Muhammad Jawed & Hameem Naveed

Abstract

Research

The aim of this study was to analyse the prevalence of Hepatitis B & C Virus among the preoperative eye surgery patients at the Liaquat University Eye Hospital, Hyderabad, from June 2014 to February 2016.

2200 patients of various ages undergoing eye surgeries and being unaware of hepatitis B & C infection were included. The blood was collected by qualified technicians of our hospital laboratory under supervision of a consultant pathologist. Each patient was serologically screened by immuno-chromatography (ICT method) for qualitative detection of antigen for Hepatitis B and antibodies for Hepatitis C before surgery. 1255 (57.04%) patients were male and 945 (42.95%) were female. Large numbers of patients were in their 4th and 5th decade of life in both the sexes. Of these 2200 patients, 338 (15.36%) were serologically positive for Hepatitis B virus & Hepatitis C virus. The majority of them were female.

The prevalence of Hepatitis B and Hepatitis C virus positive is higher in our population. Therefore, it is mandatory to screen every patient for Hepatitis B and C before any surgical procedure. The surgeon and health care professional should protect themselves by using protective masks, eye protection glasses, and double gloves before handling infected cases. Hence the used infected material, needles and other waste material should be destroyed properly using Biosafety protocols.

Keywords: Hepatitis B virus, Hepatitis C virus, Cirrhosis

INTRODUCTION

Hepatitis viruses are the most widespread cause of hepatitis and some cancer lymphomas in humans¹.Hepatitis is a serious disease of the liver and described as a lifelong infection with swelling and inflammation (presence of inflammatory cells) in the liver, that if progresses, may lead to cirrhosis (scarring) of the liver, liver cancer, liver failure, and death. Hepatitis B (HBV) and Hepatitis C (HCV) are one of the viral types of hepatitis that leads to jaundice (a yellow discolouration of skin, mucous membrane and conjunctiva of the eye), anorexia (poor appetite), fatigue and diarrhoea and presumably it remains undiagnosed and leads to chronic carrier state but most infected individuals remain asymptomatic¹⁻³. The hepatitis B virus is a DNA virus belonging to the Hepadnaviridae family of viruses and hepatitis C virus is a small, single stranded, RNA virus with a diameter of about 50 nm, belonging to Flaviviridae family of virus. Hepatitis B surface antigen (HBsAg) is present in the serum of those infected with hepatitis B, consisting of the surface coat lipoprotein of the hepatitis B virus. Anti-HCV antibody, a substance that the body makes to combat HCV⁴. Hepatitis B virus is transmitted through blood and blood products, semen, vaginal fluids, and other body fluids. Hepatitis C virus is a blood borne or parenterally transmitted infection.

contaminated blood and blood products, multi-transfusions (thalassemic and haemophilic patients), needle sharing, contaminated instruments (e.g. in haemodialysis, reuse of contaminated medical devices, tattooing devices, acupuncture needles, razors) and occupational and nosocomial exposure⁵⁻⁸. It stands to reason that an occupational risk for transmission of hepatitis virus in the health care setting, where unknown carriers of hepatitis infections are undergoing different procedures, in which there is a chance of contact of percutaneous blood, including transmission from infected patients to staff, from patient to patient, and from infected providers to patients9. There is a lack of routine serological screening prior to surgery, which is one of the factors responsible for increased disease transmission. The major risk factors include; re-use of contaminated syringes, surgical instruments and improperly screened blood products². Without meticulous attention towards infection control and disinfection and sterilization procedures, the risk for transmission of blood borne pathogens in the health care setting is magnified.

Vehicles and routes of parenteral transmission include;

The aim of our current study was to estimate the incidence of Hepatitis B and Hepatitis C among patients going through eye surgery at department of ophthalmology Liaquat University of Medical and Health Sciences Jamshoro at Hyderabad. This is one of the largest tertiary care centres in Sindh. This institution is a great referral centre for whole interior Sindh province.

MATERIAL AND METHODS

Study design and patients

This prospective observational study was carried out at Liaquat University Eye Hospital, Hyderabad, from June 2014 to February 2016. A total of 2200 patients undergoing eye surgery, who were unaware of hepatitis B & C infection were included in this study. No restriction was placed based on age and gender to ensure maximum participation.

Blood samples

The blood samples of all these patients were collected in the Hospital laboratory, Scientific Ophthalmic Diagnosis & Research Lab. Each patient was serologically screened, by using immuno-chromatography (ICT method) for qualitative detection of antigen for Hepatitis B and Hepatitis C virus antibodies, to find the carrier status of patients before surgery.

The blood was collected by a qualified technician / phlebotomist of our hospital laboratory under supervision of a consultant pathologist. Samples were allowed to coagulate at room temperature for 30 minutes, and then centrifuged at 3000 revolutions per minute (RPM) for 10 minutes. The serum samples were separated and kept frozen at -20°C for chemical and immunoassays. The HBV screening was based on the detection of antigen and detection of viral specific antibodies HCV in the sera using enzyme immunoassays. The test only shows whether a person has ever been infected by HBV or HCV, and not whether the virus is still present. According to the manufacturers' literature, the relative sensitivity and specificity of HCV and HBV testing kits was 96.8% and 99% respectively.

Those patients with test results were found positive on screening test, were further confirmed by testing ELISA (Enzyme-Linked Immunosorbent Assay) method (4th generation ELISA) and were given advised for further testing on Polymerase Chain Reaction (PCR) for qualitative or quantitative detection of DNA/RNA (the viral gene).

All the data was entered in SPSS version 16 and the prevalence and percentage of all variables was measured.

RESULTS

A total number of 2200 patients were operated during the study, 1255 (57.04%) patients were male and 945 (42.95%) were female

Of these 2200 patients, 338 (15.36%) were serologically positive for hepatitis B virus & hepatitis C virus. Out of the 338 HBV or HCV positive patients, 56 patients (2.54%) were

positive for hepatitis B surface antigen (HBsAg) and 282 patients (12.81%) were positive for hepatitis C antibody (HCVAb). (Figure 1&2). The majority of them were female, and 226 (66.86%) were in their 4^{th} and 5^{th} decade of life in both sexes (Figure 3).

Figure 1- A: Serologically positive for hepatitis C antibodies, B: Serologically negative for hepatitis C antibodies



Figure 2 - A: Serologically negative for hepatitis B antigen, B: Serologically positive for hepatitis B antigen





Figure 3: Incidence of Hepatitis B & C in different age group

DISCUSSION

Hepatitis B virus (HBV) and hepatitis C virus (HCV) are among the principal causes of liver diseases, with different frequency rates and various types all over the world. The World Health Organization (WHO) estimates that there are near 4 million people with chronic HBV infection and 170 million people with chronic HCV infection worldwide. Mortality rate of Hepatitis B is estimated to result in 563,000 deaths and hepatitis C in 366,000 deaths annually ^{1, 6, 10-12}. The occurrence of hepatitis varies from country to country. The epidemiological estimates by WHO show that there is low prevalence of hepatitis C (<1%) in Australia, Canada and Northern Europe, and almost 1% in countries of medium endemism, such as the USA and most of Europe. The frequency is at its peak (>2%) in many countries of Africa, Latin America, Central and South-East Asia ⁵. As far as the Pakistani population is concerned, the incidence of hepatitis B and C is escalating. Previous studies reveal that the Pakistani population affected by HBV 10% and HCV is 5-10%³. At times it will also vary among different regions of the same country, and is continuing to rising in certain parts, especially in the rural areas, the percentage of infected individuals is significantly higher ². The total incidence of Hepatitis B and Hepatitis C in our study was found to be 15.36%. This was almost comparison to Naeem et al found to be 12.99%² and in our previous study reported incidence of anti HCV was 29.60% ⁷. W Ul Huda et al reported 17.33% incidence of HCV infection among their operated patients⁵, whereas a study conducted by Khurrum et al reported 6% incidence of anti HCV antibodies in health care workers in a local hospital¹³. The prevalence of Hepatitis B and Hepatitis C in preoperative cataract patients was found to be higher in males (59.18%) than females (40.82%), and Ahmed et al also showed that the total prevalence of Hepatitis B and Hepatitis C in males was very high compared to females among preoperative cataract patients¹⁴, which is controversial to our result. A study conducted in 2010 on different eye camps in Pakistan showed that 108 out of 437 patients were infected with Hepatitis B and Hepatitis C with a higher prevalence of the diseases in females with 60.18% (65/ 108) than in males with 39.81% (43/108) ¹⁵.

Concerning demographic variables, the increase in the risk for HCV seropositive incidences increased with the age *i.e.* 7.1% at the age of 20 to 30 years whereas 21.4% at the age of 40 to 50 years. In our study, the higher prevalence of hepatitis B & C were in the age range of 30 - 60 years, which is comparable to the study of Talpur et al, in which 65% positive patients were above the age of 40 years¹⁶.

This study shows that the prevalence of these hepatitis causing viral pathogens are quite high. Doctors and paramedical staff in surgical and medical practice are at high risk of acquiring blood borne diseases from the patients on whom they operate.

CONCLUSION

The aim of the present study was to assess the prevalence of HBV and HCV infection among preoperative patients. The incidence of these hepatitis causing viruses are higher in our population. Therefore, it is a mandatory task to screen every patient for hepatitis B and C before any surgical procedure. The surgeons and health care professionals should protect themselves by using protective masks, eye protection glasses, and double gloves before handling infected cases. The used infected material, needles and other waste material should be destroyed properly using Biosafety protocols.

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James Paul Pandarakalam

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Abstract

Refractory auditory hallucinations warrant evidence-based pharmacological and non-pharmacological treatment strategies. The current psychotropic medications have only modest anti-hallucinatory effect and the efficacy of non-pharmacological therapies is not well established. While clozapine seems to have the maximum anti-hallucinatory effect, some patients remain super-refractory even to clozapine treatment. Thus, going forward research should focus on the discovery of a derivative of clozapine that is free from the haematological side-effects, as this could lead to remarkable advancements in the treatment of schizophrenia. Recent years have witnessed an interest in the development of various forms of non-pharmacological approaches to addressing this problem alongside pharmacotherapy. Pharmacotherapy alone may not be the answer to refractory auditory hallucinations and a greater spectrum of non-pharmacological therapies is clearly needed. In this work, different forms of non-pharmacological therapies are reviewed, including CBT, which has gained popularity as a psychological intervention and an efficacious form of voice therapy. Antipsychotics are also reviewed, revealing that, despite having only modest anti-hallucinatory properties, they are essential for reducing the psychic pain and correcting the underlying psychotic process.

Keywords: Schizophrenia, hallucinations, clozapine, voice therapies, rTMS

Schizophrenia sufferers feel like abstract entities with nonanimated bodies, often experiencing auditory verbal hallucinations (AVH) due to morbid "objectification" of inner dialogue.1 From the patient's perspective, AVHs are a subjective-objective phenomenon. AVH is a non-consensual, dynamic and psychologically charged experience and the voices often echo significant emotions. Derogatory voices are common representations of unconscious self-hatred that cannot stand up to the external world's logic. Thus, patients need help to incorporate it. Auditory hallucinations may be arising because of an interaction between biological predisposition, perceptual and cognitive factors. According to an integrated model of auditory hallucination (AHs) suggested by Waters et al,²AHs arise from an interaction between abnormal neural activation patterns that generate salient auditory signals and top-down mechanisms that include signal detection errors, executive and inhibition deficits, a tapestry of expectations and memories. Recently, neuro-quantologists have proposed that AVHs may be an objectification of parallel thinking/quantum thinking.³ Parallel thinking is a source for thought insertion. There may be different variables of AVHs. Experiencing AVH has serious impact on the quality of life of the affected individual, and is a significant factor in prevalence of suicides among schizophrenic patients.4

Incidence

One in four schizophrenia sufferers experiences persistent AVH .5 AVHs are experienced by approximately 53% of schizophrenia sufferers 6 and are present in 28% of major affective disorders (Goodwin& Jamison, .7 Evidence indicates that each patient responds differently to the voices, according to his/her evaluation of them (Table 1), which influences the degree of interventions. Specific dimensions of AVHs can give hints to the future likelihood of treatment resistance. Although the percentages differ in various studies, it is assumed that about 30% of patients have command hallucinations and they are seen as the ultimate betraval of the mind. 8 Often, the content of such messages is negative; thus, commanding AVHs are more distressing than commenting ones. Schizophrenia predisposes them to a greater risk of suicides and homicides. Command hallucinations are more prevalent among forensic patients and contribute to their forensic status.

The multi-factorial polygenic model of schizophrenic disorders has received great support and signifies that genetic factors play a bigger role than environmental factors in familial transmission of these disorders. Relevant studies provide little support for the mechanism of single major locus inheritance. A mechanism involving two, three, or four loci cannot be ruled out even though there is no compelling support for such models.⁹ It has also been proposed that a single gene may be even responsible for hallucinatory experiences ¹⁰ implying that those who have not inherited such a gene may not experience auditory hallucinations, but still could experience other characteristic symptoms of schizophrenia. One may also hypothesise that an individual who has inherited such a "hallucinatory gene" but not all the schizophrenia genes could hear non-clinical voices without having other schizophrenic symptoms. It is also arguable that those who carry such a specific gene are more vulnerable to experience hallucinations when they abuse psychoactive substances and could get misdiagnosed as having schizophrenia, but hallucinations may cease to occur once they abstain from illicit drug abuse.

1 Anviety and panic feelings	
1.7 mixiety and pame reenings	
2.Fear	
3.Feelings of humiliation	
4.Entrapment	
5.Self harm thoughts	
6.Harm to others	
7. Avoidant or withdrawn	
8.Shouting and swearing	
9.Ritualistic behaviour	
10. Substance or alcohol abuse	
11. Resistance.	
12. Amusements	
13. Engagement and courting the voices	
14. Appeasement	

Measurements for Assessment

AVH is a subjective experience and is hard to measure objectively. Several rating scales are now available for an efficient evaluation of different aspects of voice activities. Some are general and a number of them are specifically designed. Using rating scales facilitates better engagement with patients and helps in reinforcing the message that patients and the distress they experience are carefully considered.

Beliefs About Voice Questions (BAVQ) is an assessment scale useful in measuring the key beliefs about the voices.¹¹ It is typically used in conjunction with the Cognitive Assessment Schedule (CAS).¹² Voice Compliance Scale (VCS) is an observer rated scale aimed exclusively at measuring the frequency of command hallucinations and the level of obedience or confrontation with each recognized command.¹³ Voice Power Differential Scale (VPD) is another measure that can be applied to rate the perceived relative power differential between the voice and voice experience.¹⁴ On the other hand, Omniscience Scale (OS) is intended to quantify the voice hearer's beliefs about their voices' knowledge regarding the bio data.¹⁵ Another measure presently in use is Risk of Acting on Commands Scale (RACS), designed to assess the level of risk of acting on commands and the amount of associated distress.¹⁶ The Bonn Scale (BSABS) is used for the assessment of basic symptoms, ¹⁷while the Schizophrenia Proneness Instrument (SPI-A) ¹⁸and the Examination of Anomalous Self Experience (EASE) ¹⁹ are useful aids in identifying minimal changes in subjective experience and for longitudinal monitoring (Table 2). In the extensively used Positive and Negative Syndrome Scale (PANSS), the hallucination item is one of seven in the positive subscale, which also includes delusions, conceptual disorganization, excitement, grandiosity, suspiciousness, and hostility. Given such a great number of scales in use, there is an obvious risk that differential anti-hallucinatory efficacy among antipsychotic drugs may be obscured by means of sum scores for the whole sample in clinical trials.

Table 2 Measurement scale

Beliefs About Voice Questions (BAVQ) Cognitive Assessment Schedule		
(CAS).		
Voice co Voice Power Differential Scale (VPD)		
Voice Compliance scale (VCS)		
Voice Power Differential Scale (VPD)		
Omniscience Scale (OS)		
Risk of Acting on Commands Scale (RACS)		
Bonn Scale (BSABS)		
Schizophrenia Proneness Instrument (SPI-A)		
Examination of Anomalous Self Experience (EASE)		
Positive and Negative Syndrome Scale(PANSS)		

Treatments

Although many forms of treatments aiming to eliminate AVH or improve quality of life are available, use of medication seems to be the most prevalent. Besides drug treatment, non-invasive physical treatments, such as TMS and different forms of psychological interventions, have recently evolved. Drug therapies are aimed at symptom eradication, whereas psychological therapies tend to foster healing, recovery and personal growth. Rather than being specifically antihallucinatory, typically, neuroleptics offer a generalised calming effect and patients are given some "breathing space" to work through their voices. Usage of non-pharmacological tools is needed in the long-term management of refractory cases. Presently, intervention strategies for AVH are based on different models of hallucinations, but regrettably no clear models have been established.

Pharmacotherapy

The current understanding of AVH and the neural mechanisms involved is limited, and knowledge on how CNS drugs, such as antipsychotics, influence the subjective experience and neurophysiology of hallucinations is inadequate. Consequently, using pharmacotherapy in the management of AVH remains very challenging. ²⁰ Despite multiple trials of different combination and adjunctive therapies to an antipsychotic regime, AVH can remain drug resistant. It is also important to note that all antipsychotics are potentially anti-hallucinatory, even though these effects are usually modest. Moreover, given that, even when medications are effective, concordance can be an issue, antipsychotics should be used prudently and weighed up against effectiveness and side effects (Table 3). There are no clear guidelines for the drug treatment of AVH and comparisons of the efficacy of antipsychotics for AVHs are few. Clinical drug trials very rarely focus on single symptom scores, such as hallucinations, and tend to report group mean changes of overall psychopathology, or at best the positive subscale scores.

Evidences show that AVHs persist in spite of treatment in 32% of chronic patients²¹ and 56% of acutely ill patients.²²Trifluperazine was popular as an anti-hallucinatory drug before the advent of atypical antipsychotic drugs. Clozapine is currently favoured for intractable AVHs and is beneficial in 30–60% of unresponsive patients.

Antipsychotic co-treatment is an option for clozapine augmentation. Olanzapine and risperidone may be alternative drugs in first episode psychosis. However, it is being debated whether clozapine should be used in such cases.

Table 3 Drug Treatment

Choice of antipsychotics Cautions and contraindications Titration of dose Switching antipsychotics Assessment of side effects, EPS, TD, Haematological effects etc. Measuring the beneficial effects Assess worsening of symptoms Compliance

Clozapine

Use of clozapine is suggested only after two other antipsychotics have been tried. It works better with continued usage and clinicians have to be patient in its upward titration. At six months, improvement in Global Assessment of Functioning score is significantly higher for clozapine in comparison to other antipsychotic drugs.²³ However, when prescribing clozapine, cautions and contraindications must be noted (Table 4).

While higher doses of clozapine may not have more antihallucinatory effect, they still carry the risk of inducing the potential side-effects of this highly efficacious drug (Table 5). The most dreaded haematological side-effects are usually manifested within six months. For that reason, during clozapine therapy, patient has to be closely monitored, bearing in mind its limitations in achieving the anti-hallucinatory effects. If higher doses do not have the desired effect, clozapine dose should be titrated downwards to a point of its maximum antihallucinatory effect in a particular patient. Such an endeavour can prevent the emergence of serious side-effects, resulting in a complete failure of the therapy. The dose can also be adjusted to a safer level in cases where the psychological interventions are found to be successful. Clozapine can be effective even in lower doses, such as 200 mg/day. Only in the presence of command hallucinations, higher doses should be prescribed to patients whose other positive symptoms are well under control.

Prophylaxis with an antiepileptic drugs, such as lamotrigine or sodium valproate, or similar should be commenced before titrating the dose above 600 mg daily. Close monitoring and active treatment of metabolic dysregulation should be initiated concurrent with clozapine therapy. In clozapine therapy, weighing up safety and superior antipsychotic efficacy and educating the patients on "clozapine lifestyle" is immensely important, as it helps in treating refractory cases of AVH. Thirty percent of patients treated with clozapine may remain unresponsive and clinicians have to lower their expectations to the level of achievement without being cynical. Isolated cases of clozapine-induced joint visual and auditory hallucinations have been reported.²⁴In spite of Clozaril treatment having the highest anti-hallucinatory effect, a good percentage of AVH sufferers remain symptomatic and are classed as superrefractory.8 According to Gonzales (2006), 2500% of patients receiving antipsychotics achieve full remission, while 25% hear voices occasionally and 25% are unresponsive.

Table 4 Cautions & Contraindications of Clozapine

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1.Patients with myeloproliferative disorders, a history of toxic or
idiosyncratic agranulocytosis or severe granulocytopenia (with the
exception of granulocytopenia / agranulocytosis from previous
chemotherapy)
2.Bone marrow disorders
3-Patients with active liver disease, progressive liver disease and hepatic
failure.
4-Severe CNS depression or comatose state, severe renal and cardiac
disease, uncontrolled epilepsy, circulatory collapse,
5. Alcoholic/toxic psychosis and previous hypersensitivity to clozapine.
6.Pregnancy and breast feeding

Table 5 Benefits and risks of Clozapine

Benefits
1. Lower risk of suicide
2. Superior anti-delusional and anti-hallucinatory effects in refractory
cases
3. Lower risk of tardive dyskinesia and suppression of TD.
4. Improvement in cognition
5.Higher quality of life and better adherence
6.Decreased relapse
7. Sexual functions unaffected
Risks
1.Agranulocytosis
2.Metabolic syndrome
3.Myocardites
4.Chronic constipation and bowel complications
5.Incresed risk of seizure
6.Hypersalivation
7.Abrupt withdrawal cause marked discontinuation symptoms.

Benzodiazepines are often abused by voice hearers aiming to reduce their anxiety. Such patients might benefit by the addition of antidepressant, as this could enhance their mental resources to cope with the voices, even though they have no anti-hallucinatory effects per se. Mood stabilisers are sometimes used to augment the efficacy of antipsychotics without any clinical validation. Despite multiple trials of different adjuvant therapies to an antipsychotic regimen, there have been few promising results. Still, in practice, clinicians may get frustrated, as they struggle to provide symptomatic relief to the voice hearers at any cost. Recently allopurinol, an anti-gout agent has been used as an adjunctive therapy and based on three randomized controlled trials, the result has been encouraging.²⁶

Psychological Interventions

Persistent AVHs alone may not warrant pointless alteration of medication, as non-pharmacological interventions may achieve some control. When clinicians are not cognizant of nonpharmacological therapies, AVH patients that do not respond to antipsychotics alone may be mislabelled as having refractory AVH. In fact, they are only unresponsive to drug treatment, and could potentially respond to an integrated approach. Similarly, patients with treatment-refractory AVH are often over-diagnosed as suffering from hard to treat schizophrenia, even when other positive symptoms have been ameliorated.

There exists a false dichotomy between physical and psychological treatment approaches to AVH. In practice, both treatment modalities have to be modified in a personalised form. After all, psychiatry was originally known as psychological medicine. Presently, even though different forms of non-pharmacological interventions are available for drug-resistant AVH, some have questionable effects. ^{27,28,29} (Table 6).

Table 6 Psychological Inter	ventions
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1.Cognitive behavioural therapy (C.B.T.)
2. Acceptance and commitment therapy (ACT)
3. Competitive memory training (COMET)
4.Compassionate Mind Training therapy (CMT)
5.Hallucinations focussed integrative therapy (HIT)
6.Midfulness-based therapy
7.Normalizing techniques
8. Enhanced supportive psychotherapy
9. Attention training technique.

- 10. Distraction techniques
- 11. Self help approaches

CBT therapists predicate that AVHs are a manifestation of the morbid objectification of inner dialogue (thinking in words), and accordingly verbalised thoughts are the raw material for AVHs. Verbal thinking differs from external speech in many respects and has several distinct features. CBT therapists believe that cognitive dysfunctions underlie AVH and they target them with cognitive remediation strategies. Those experiencing voices commonly think that they are caused by a powerful external agency, and are controlling and potentially harmful. Psychological factors, such as meta-cognitive biases, beliefs, and attributions concerning the origins and intent of voices, also play critical modulatory role in shaping the experience of AVH. Teaching patients to recognize the source of the voices alone has yielded beneficial effects.

Specific techniques have been designed to modify the frequency of AVHs and restore a sense of control over them. Earlier methods involved behavioural approaches based upon addressing hypothesized antecedents and reinforcers of voices and explored a variety of specific interventions such as relaxation training, graded exposure to voice triggers, manipulation of environmental possibilities and even aversion therapy. 30 These behavioural techniques were eventually expanded on by the application of cognitive methods. The primary aim of psychological therapy is to change the belief that voices are omnipotent and uncontrollable and to suppress the associated attributes of false identity, wrong intentions, and urges to harm oneself and others. They encourage patients to challenge irrational interpretations and modify maladaptive behaviour, diverting attention from voices with distraction techniques (Table 7).

Reality testing and behavioural experiments are one form of CBT intervention, based on the view that behavioural changes can prompt cognitive changes. Attention switching can also be used to challenge the belief that hallucinations are uncontrollable. Command AVHs are more prevalent among the forensic population and are more distressing than the commenting ones. The risk of the sufferer acting on them is high when voices are perceived as omnipotent and uncontrollable. CBT has been proven beneficial in tackling command hallucinations. Lack of insight and formal thought disorder may not necessarily disqualify CBT for AVH; nonetheless, negative symptoms may pose a barrier to this form of psychological intervention. The current model of CBT for psychosis has been criticized, suggesting that it is simply an extension of general CBT concepts without taking into account the specificities of psychosis. ³¹ Patients with higher intelligence, who have the ability to grasp abstract concepts, might gain greater benefits from CBT. 32

Table 7 Goals of CBT

- 1. Change false beliefs about AVH .
- 2. Challenge irrational interpretations.
- 3. Modify maladaptive behaviour e.g. fear of the voices or hiding from them.
- 4. Divert attention, using distraction techniques.
- 5. Build and maintain treatment strategies
- 6.Develop cognitive behavioural strategies
- 7.Develop newer understanding of hallucinatory experience
- 8. Address negative self-evaluation.

Combining psycho-education and supportive psychotherapy has been found to enhance the functioning and self-esteem of voice hearers, providing a therapeutic structure. In the increasingly popular self-help voice-hearing groups, the ethos of recovery is understanding, accepting and integrating the sufferer's turmoil. Acceptance and non-judgemental support of people with similar experiences has helped many patients cope with the condition. In response, the number of books on AVH, aiming to educate the sufferers and carers, has grown considerably.

Newer Psychological Interventions

Attention Training Technique (ATT) focuses on negating psychological distress through cognitive and meta-cognitive modification.^{33,34} Patients focus on up to five neutral sounds, such as a dripping tap, before switching their attention between different sounds. They then practise listening to all the sounds simultaneously. After a few weeks, they focus on neutral sounds and then on the AVH. Once this process is mastered, they switch attention between voices and other sounds, before being asked to divide their attention among them. This exercise continues for several weeks, whereby the aim is to replace the self-regulatory process with new processing configurations.

Acceptance and commitment therapy (ACT) is aimed at achieving psychological flexibility. It incorporates mindfulness and acceptance, considering AVH as a private experience and asserting that patients experience distress only when they try to deafen the voices. . By reducing struggle with voices and engagement with them, key responses such as arousal, attention and activation of brain areas are hypothesised to be reduced. 35 The ideas behind ACT are consistent with the emphasis on the recovery movement of finding a way to live a valued life despite the ongoing problems. To this effect, unique and effective coping strategies are offered, whereby patients are given the insights that parts of the self are behind the voices. Thus, accepting them means sending a loving message of compassion, acceptance and respect to oneself Two randomised control studies have yielded promising results. ^{36,37}ACT follows a set manualised structure, rather than relying upon the complex and lengthy process of belief modification: therapy can be much briefer and potentially practiced by a wider range of clinicians and cost effective. 38

There are verbal and non-verbal routes to emotions. As CBT uses the former in voice therapy, it is less effective when patients are negatively involved with the voices. On the other hand, Competitive Memory Training (COMET) uses the non-verbal route. Generally COMET sessions involve four stages.³⁹ A. identification of aspects of negative self-esteem reinforced by the voice; B. retrieval and re-living of memories associated with positive self-esteem; C. positive self-esteem is brought to compete with the content of the voices to weaken associations between voice content and negative self-valuation; and D. learning to disengage from the voices and to accept the voices as psychic phenomenon.

The significant past comes back to the conscious mind in AVH, as life experiences charged with emotion make a compelling impression on the brain. The observation that voices are knowledgeable about patients suggests that auditory hallucinations are linked to memory. In other words, negative experiences from memories evoke emotions, which should be deactivated. Distancing and decentring techniques could help patients to interpret voices as false mental events. As a result, incompatible memories could become tools to modify the power of voices—they are deactivated by new learning. Thus, when voices torment hearers, telling them that they are failures, a competing memory of such success as passing a significant examination is introduced. Posture, facial expression, imagination, self-verbalisation and music are all procedures included in the COMET protocol.⁴⁰

Compassionate mind training (CMT) is used to encourage better resilience to unpleasant commenting voices.CMT involves practicing exercises which promote self-compassion and compassion towards others. It is targeted to activate brain systems involved in social and self-soothing that amend threat systems active when experiencing unfriendly voices.⁴¹

Mindfulness is paying attention in a particular way – on purpose, in the present moment and non-judgementally. Clinical literature cautions against use of meditation in psychosis, but the effectiveness of mindfulness-based approaches for people with psychosis has been demonstrated in controlled clinical settings. ⁴²and in the community. ⁴³ Abba et al. ⁴⁴argue that effectiveness of mindfulness is a three-stage process: a. Becoming knowledgeable and developing more awareness of psychotic experiences and observing the thoughts and emotions that follow them. B. Permitting psychosis to come and go without reacting in order to cultivate understanding that distress is produced by the meanings one attaches to thoughts and sensations. C. Becoming autonomous by accepting psychosis and the self by acknowledging that the sensations only form part of the experience, and are not a definition of the self.

Neuroimaging studies are beginning to explain the neural mechanisms of how mindfulness might be working clinically. Structural changes have been observed in the anterior cingulate cortex, which is an area of the brain associated with emotional regulation.⁴⁵. There is evidence to suggest that mindfulness practice is correlated to reduced brain activity in the default mode network.⁴⁶

Limited improvements with mono-therapy have prompted the development of multi-modular approaches. Hallucination-focused Integrative Therapy (HIT) is geared towards integrating CBT with neuroleptics, coping strategies, psycho-education, motivational intervention, rehabilitation and family treatment.⁴⁷ Extant studies indicate that integrated treatment is more effective than TAU (treatment as usual).

The continuum model of psychosis and ordinary mental events has incited the development of normalisation of the voice hearing experience.⁴⁸ Most psychiatric symptoms occur in normal people—just as breathlessness and palpitations occur while exercising—but are potential clinical symptoms. It is the

frequency and duration that determine the borderline. According to the cognitive model, an internal mental event receives external attribution. Through normalisation, the external attribution can be reversed.

Although drug treatment may be the most practical way of managing AVH, refractory cases pose formidable challenges and it must be emphasized that psychological treatments are not counterproductive if applied skilfully. Clinicians who espouse the view that psychosis is a medical condition dismiss the usefulness of psychological interventions. The counter argument would be that a patient with a medical condition, such as stroke, benefits from physiotherapy, occupational therapy and psychological approaches.⁴⁹

Repetitive Trans-cranial Magnetic Stimulation

There are several ongoing trials in which the aim is to treat refractory AVH (Table 4). Repetitive transcranial magnetic stimulation (rTMS) is thought to alter neural activity over language cortical areas. Several studies on rTMS have shown improvement in the frequency and severity of AVHs, albeit without offering any strong conclusive evidence for its efficacy .⁵⁰ Moderate rates of AVH attenuation following rTMS have been noted in three meta analyses. Given that remarkable improvements in isolated cases have also been claimed, this suggests that rTMS may be appropriate mode of therapy for some patients.

Available data suggest that .rTMS selectively alters neurobiological factors that determine the frequency of AVH. However, a recent meta-analysis indicated that the effect of rTMS may be short-lived (less than one month).⁵¹ Studies seem to indicate that rTMS may be effective in reducing the frequency of AVHs, with little effect on their other topographical aspects.^{50,52} Sham stimulation has also led to improvements in a number of AVH parameters. Compared to bilateral stimulation, rTMS of left tempero-parietal region appears more effective in reducing the AVH frequency .53 To reduce the distress associated with AVH and help patients to cope with hallucinatory predilection, rTMS could be combined with CBT. The side-effect profile is much cleaner for this biological approach when compared to medications. Still, like any other anti-hallucinatory treatments, neuro-stimulation technique does not guarantee long-term elimination of AVH. Electroconvulsive therapy (ECT) is considered a last resort for treatment resistant psychosis. Although several studies showed clinical improvement, a specific reduction in hallucinations severity has never been demonstrated.

Avatar Therapy

Computer-assisted voice therapy is a budding form of computerised psychological treatment that is currently undergoing trials.²⁸ In this novel therapy, persecutory voices are directly depowered with the aid of a computerised dummy of the alleged persecutor through voice dialogue. Analytically-

oriented therapists can even converse with "voices" and such committed clinicians will find computerised voice therapy as another helpful tool. It is hard to ascertain whether the benefits of the avatar therapy were due to the specific technique involved or simply the increased attention and care, and Leff's team acknowledged the limitations of their work.⁵⁴

Sound Therapy

Another important development in voice therapy is the use of tinnitus control instrument (TCI)—a form of sound therapy in treating refractory AVH. Similar to AVH, subjective tinnitus is defined as the false perception of sound in the absence of acoustic stimuli. Even though their definitions are similar, the origin and underlying causes of these two conditions differ. Tinnitus is characterised by a simple sound—a monotone—and is non-verbal. In tinnitus, the brain is believed to interpret an internally generated electromagnetic signal as an acoustic sound or sounds.

Kaneko, Oda, and Goto²⁹ reported successful intervention in two cases of refractory AVH with sound therapy, using tinnitus control instrument (TCI) alongside antipsychotic medications. They posited that, in sound therapy, the auditory system is directly helping the limbic nervous system and the neuromechanism for AVH is sensitive to sound therapy .⁵⁵They concluded that low-level auditory stimulation might be hindering the progression of voices and brain might be getting a breathing space to initiate self-healing process.

Future Directions

Hallucinogenic drugs, anti-hallucination medications and neuroimaging studies may lead to a better understanding of AVH. Animal models of hallucinations and pharmacogenetics might help to find more efficacious anti-hallucinatory drugs. AVHs themselves may have a genetic origin.¹⁰ Thus, not all patients that develop schizophrenia would experience AVHs. Such a finding might help shed more light on the geneticslinked mechanism and remedial measures of hallucinations in schizophrenia. Because the biological substrates facilitating drug effects on hallucinations remain largely unidentified, future studies with translational designs should address this important issue to find a more targeted drug treatment of psychosis.⁵⁶

If a derivative of clozapine without the haematological sideeffects is formulated in the future, it might be an important milestone in the treatment of refractory AVHs and schizophrenia because clozapine has the most potent antihallucinatory effect. Such a novel drug could become the first line of treatment for schizophrenia, as it would address many of schizophrenic symptoms at their onset. This is crucial, as symptoms and habits become stronger and more resistant the more frequently they occur. Fatty acid amide derivatives of clozapine, such as DHA-clozapine, are found to have better pharmacological properties and enhanced safety. However, such claims are awaiting substantiation in clinical trials.⁵⁷Thus, more attention needs to be directed into this potentially rewarding research arena. It is, however, very likely that, even after a better pharmacological cure is found for AVHs, a few symptoms might linger on for long periods. With this view, efficient nonpharmacological remedies have to be designed to deal with such residual symptoms.

Discussion

Medications help reduce the psychic pain, and protect the dignity of patients, as well as prevent suicides and homicides. From the patient's perspective, the calming and relaxing effects of pharmacological therapies are a priority for relief from the distress due to AVH. Among the antipsychotics, clozapine has the maximum anti-hallucinatory effect and it is a shame that it cannot be used as a first line treatment choice. Treatment of AVH should be individualistic and clinicians should be prepared to apply several clinical and non-clinical approaches in concert to address them.

More research into the aetiology and mechanism of AVH is warranted in order to find effective treatment strategies. There is no shortage of theories about the mechanism of AVH, but there is no consensus among the investigators. It is unlikely that AVH is a pure neuro-chemical experience or a biological glitch, and this is where the currently available drug treatments fail. The distinction between primary and secondary symptoms was lost with the triumph of biological psychiatry in the last century. Thus, some authors presently claim that AVHs may even be a secondary symptom or a neuroquantological manifestation of an underlying biological disorder. We should not minimise the importance of eliminating symptoms when such symptoms are incapacitating, as in the case of hallucinatory experiences.

The present recovery model that emphasises and supports the patient's potential for recovery involving hope, supportive relationship, empowerment, social inclusion, coping skills and meaning cannot be achieved without the help of psychological interventions. In this respect, CBT is a useful tool in the rehabilitation of psychotic patients with residual AVH. Jauhar et al.58 argued that the effectiveness of CBT in schizophrenia is influenced by failure to consider sources of bias. Consequently, the benefits are more apparent than real, prompting the question of whether CBT has been oversold.⁴⁹ The verdict of Maudsley debate on the issue has been that CBT has not been oversold, but rather has a great impact on symptom reduction and enhancing concordance and insight. Perhaps the most informative trial so far accomplished has been the work on cognitive therapy for command hallucinations, which has proven the benefit of specific model development, and which productively, combined measurement of process and a targeted outcome.59

There is ample evidence suggesting that a combination of family and psychological interventions, alongside

pharmacotherapy, can be the most effective way of dealing with refractory AVH.⁶⁰ The inner dialogue hypothesis of AVH held by CBT therapists has its opponents.⁶¹ Patients respond to the voices they experience by utilising inner speech. Some observations with corresponding features weaken the innerdialogue hypothesis. David and Lucas have demonstrated in a single case study that short-term maintenance of phonological representation (inner dialogue) may co-exist with AVHs – they are not synonymous experiences. The cost-effectiveness of psychological interventions is poorly studied, despite being highly relevant for policy decisions in healthcare.

Computerised voice therapy works better with technically minded, highly intelligent patients. In contrast, individuals of low to average intelligence may require a primarily behavioural approach, with limited efforts to understand concepts, such as automatic thinking and schema. Unlike sound therapy through music playing instruments (iPad, iPod, iPhone, etc.), TCI causes no disruption to daily functioning and can be used continuously. Computerised voice therapy and sound therapy warrant standardised case trials. When it comes to treating AVHs, optimizing compliance, reducing the burden of symptoms, and improving control, quality of life and social functioning should be the therapeutic goals.⁶²Neuroquantological views of AVHs63 explain the limitations of pharmacotherapy and the usefulness of psychological interventions.

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Ventilator-associated pneumonia: A review of the clinically relevant challenges in diagnosis and prevention

Varun Goel, Savita Gupta and Tarun Goel

Abstract

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Ventilator-associated pneumonia is one of the most commonly encountered nosocomial infections in the intensive care units and is associated with high morbidity and high costs of care. Inspite of extensive studies for decades, a clear diagnostic and prevention strategy is still eluding Ventilator-associated pneumonia. Clinical diagnosis has been criticized to have poor accuracy and reliability. Quantitative cultures obtained by different methods seem to be rather equivalent in its diagnosis. Blood cultures are relatively insensitive to diagnose Ventilator-associated pneumonia. Thus, the Centers for Disease Control and Prevention has introduced a new definition based upon objective and recordable data. New preventive strategies are focused on the improvement of secretions drainage and prevention of bacterial colonization. We performed a literature review to describe the evidence-based Ventilator-associated pneumonia-diagnosis and prevention strategies that have resulted in clinically relevant outcomes. An integrated approach should be followed in diagnosing and preventing Ventilator-associated pneumonia.

Keywords: Pneumonia, Nosocomial Infections, Ventilator Associated Pneumonia, ventilator bundle

INTRODUCTION

Ventilator-associated pneumonia (VAP) is a type of nosocomial pneumonia that occurs in patients who receive mechanical ventilation and is usually acquired in the hospital setting approximately 48–72 hours after mechanical ventilation.¹ VAP is one of the most frequent hospital-acquired infections occurring in mechanically ventilated patients and is associated with increased mortality, morbidity, and health-related costs. Several risk factors have been reported to be associated with VAP, including the duration of mechanical ventilation, and the presence of chronic pulmonary disease, sepsis, acute respiratory distress syndrome (ARDS), neurological disease, trauma, prior use of antibiotics, and red cell transfusions.² VAP occurrence is closely related to intubation and the presence of the endotracheal tube (ETT) itself.

Since there are inadequate objective tools that are utilized to make an assessment of bacterial-induced lung injury in a heterogeneous group of hosts, the diagnosis of VAP is challenging. Around 90% of ICU-acquired pneumonias occur during mechanical ventilation, and 50 % of these ventilator-associated pneumonias begin in the first 4 days after intubation.³ VAP has a cumulative incidence of 10-25% and accounts for approximately 25% of all ICU infections and 50% of its antibiotic prescription, making it the primary focus for risk-reduction strategies.^{1,4} For all these reasons, early diagnosis and prevention of VAP has held a prominent position on the research agenda of intensive care medicine in the past 25 years,

with an ultimate goal of improving patient outcome, preferably by reducing mortality.

The keywords, 'ventilator-associated pneumonia,' in PUBMED revealed a total of 3612 titles and 625 review articles within the search limit of 10 years, between 2005 and 2014. Only articles in English were chosen.

PATHOGENESIS

Understanding the pathogenesis of VAP is the first step in the formulation of its appropriate preventive and therapeutic strategies. The initial step in the pathogenesis of VAP is bacterial colonization of the oropharynx and gastric mucosa, followed by translocation of the pathogens to lower respiratory tract. The most common means of acquiring pneumonia is via aspiration which is promoted by supine position and upper airway and nasogastric tube placement.^{2,5} In a mechanically ventilated patients, aspiration occurs around the outside of the endotracheal tube rather than through the lumen. Secondly, aerobic Gram-negative bacteria presumably reach the lower airway via aspiration of gastric contents or of upper airway secretions. Other means by which VAP can be acquired include aspiration from the stomach or nose and paranasal sinuses. Figure 1 depicts the essential elements favoring colonization of lower respiratory tract with the bacterial pathogens with subsequent development of pneumonia.^{2,5,6}

Figure 1: Pathogenesis of Ventilator-associated pneumonia⁵

*Gastric alkalinization; prior antimicrobials; ICU stay; intubation; supine position; circuit/airway manipulation and mishandling; device cross-contamination; sedation; diminished cough reflex; and malnutrition predispose to colonization and aspiration. As the duration of ICU stay increases, colonization with MDR Gram-negative pathogens like *Pseudomonas* and *Acinetobacter* increases.

†Via contaminated nebulizers/aerosols

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Table 1: CDC Algorithm for VAP diagnosis³⁰

6 6	
1= Purulent respiratory secretions AND one of the	2= One of the following (without requirement for purulent respiratory secretions):
following:	
Positive culture of endotracheal aspirate, ≥	Positive pleural fluid culture
10 ⁵ CFU/ml *	
Positive culture of bronchoalveolar lavage, ≥	Positive lung histopathology
10 ⁴ CFU/ml*	
Positive culture of lung tissue, $\geq 10^4$ CFU/ml*	Positive diagnostic test for Legionella spp.
Positive culture of protected specimen brush, ≥	Positive diagnostic test on respiratory secretions for influenza virus, respiratory syncytial virus,
10 ³ CFU/ml*	adenovirus, parainfluenza virus
On or after calendar day 3 of mechanical ventilation and within 2 calendar days before or after the onset of worsening oxygenation, criteria 1 or 2 is met	
(*or equivalent semi-quantitative result).	

Table 2: Practices for which insufficient evidence or no consensus exists about Efficacy^{8,57}

Rotational or turning therapy	Routine use of turning or rotational therapy, either by 'kinetic' therapy or by continuous lateral rotational therapy
Systemic antimicrobial agent	Routine administration of systemic antimicrobial agent(s) to prevent pneumonia in those receiving mechanically-
prophylaxis	assisted ventilation.
	Changes in the antimicrobial agents class used for empiric therapy
Oral chlorhexidine	Routine use of an oral chlorhexidine rinse for the prevention of healthcare-associated pneumonia in all
rinse for oropharyngeal colonization	postoperative or critically ill patients and/or other patients at high risk for pneumonia.
Ventilator breathing circuits with	No recommendation can be made for the preferential use of HMEs to prevent pneumonia in patients receiving
HMEs	mechanically assisted ventilation
	No recommendation can be made for placing a filter or trap at the distal end of the expiratory-phase tubing of the
	breathing circuit to collect condensate
Suctioning of respiratory tract	No recommendation can be made for the preferential use of either the multiuse closed-system suction catheter or
secretions	the single-use open-system suction catheter
Prevention of aspiration associated	Small-bore tubes for enteral feeding
with enteral feeding	Enteral feedings continuously or intermittently should be given
Patient care with tracheostomy	Daily application of topical antimicrobial agent at the tracheostoma
Gloving	Wearing sterile rather than clean gloves when performing endotracheal suctioning

COMMON CAUSES

The specific microbial causes of VAP vary widely depending in epidemiological and clinical factors. Common pathogens include aerobic gram negative bacteria such as *Pseudomonas aeruginosa* and members of family *Enterobacteriaceae*, staphylococci, streptococci, and *Haemophilus* species. Microorganisms like *Pseudomonas spp., Acinetobacter* spp. and Methicillin-Resistant *Staphylococcus aureus* occur commonly after prior antibiotic treatment, prolonged hospitalization, mechanical ventilation or when other risk factors are present.^{6,7}

Moreover, deliberated ill patients may have defect in phagocytosis and behave as functionally immunosuppressed even prior to emergence of nosocomial infection as seen by many recent studies.^{8,9}

DIAGNOSIS

Clinical Diagnosis

No gold standard of diagnosis for identifying VAP is there inspite of variety of proposed definitions. VAP has traditionally been diagnosed by clinical criteria of Johanson and colleagues (appearance of new or progressive pulmonary infiltrates, fever, leucocytosis and purulent tracheobronchial secretions), which are non-specific. When findings on histologic analysis and cultures of lung samples obtained immediately after death were used as references, a new and persistent (>48-h) infiltrate on chest radiograph plus two or more of the three criteria (i) fever of >38.3°C, (ii) leukocytosis of >12 \times 10⁹/ml, and/or (iii) purulent tracheobronchial secretions had a sensitivity of 69% and a specificity of 75% for establishing the diagnosis of VAP.¹⁰

Because of the poor specificity of the clinical diagnosis of VAP and of qualitative evaluation of ETAs, Pugin et al. developed a composite clinical score, called the clinical pulmonary infection score (CPIS), based on six variables: temperature, blood leukocyte count, volume and purulence of tracheal secretions, oxygenation, pulmonary radiography, and semi-quantitative culture of tracheal aspirate. The score varied from 0 to 12. A CPIS of >6 had a sensitivity of 93% and a specificity of 100%.11 Accuracy of CPIS in diagnosis of VAP is debated, despite of its clinical popularity. In one meta-analysis study evaluating the accuracy of CPIS in diagnosing VAP reported pooled estimates for sensitivity and specificity for CPIS as 65 % (95 % CI 61-69 %) and 64 % (95 % CI 60-67 %), respectively.12 The poor accuracy of clinical criteria for diagnosing VAP is due to purulent tracheobronchial secretions in patients receiving prolonged mechanical ventilation which are rarely caused by pneumonia. Moreover, in pneumonia systemic signs such as fever, tachycardia, and leukocytosis are nonspecific; they can be caused by any state that releases the cytokines interleukin-1, interleukin-6, interleukin-8, tumor necrosis factor alpha (TNF α), and gamma interferon.^{13,14} The weak point of CPIS is probably the inter-individual variability (kappa= 0.16), since a subjective evaluation is required when we are judging the quality of tracheal secretion (purulent/not purulent) and the presence of infiltrate at chest ray.¹⁵

Radiologic Diagnosis

Radiographical evidence of pneumonia in ventilated patients is also notoriously inaccurate. In a study of autopsy proven VAP, of the total population, only air bronchograms correlated with pneumonia and no specific roentgenographic sign correlated with pneumonia in patients with adult respiratory distress syndrome. The differential diagnoses of VAP based on radiographical appearance, include adult respiratory distress syndrome, congestive heart failure, atelectasis, pulmonary embolism and neoplastic infiltration.¹⁶

Microbiologic Diagnosis

The type of specimen that should be obtained for microbiologic processing as soon as VAP is suspected is another area of importance. The use of quantitative cultures is one of the main issues for any diagnostic laboratory because there is oropharyngeal bacterial contamination of all respiratory secretion samples, despite this is not always undertaken in many hospitals today.^{16,17}

Blood cultures

Blood cultures have limited value because organisms isolated from blood in suspected VAP cases are often from extrapulmonary sites of origin.¹⁸ Blood cultures in patients with VAP are clearly useful if there is suspicion of another probable infectious condition, but the isolation of a microorganism in the blood does not confirm that microorganism as the pathogen causing VAP.

Quantitative cultures of airway specimens

Simple qualitative culture of endotracheal aspirates has high percentage of false-positive results due to bacterial colonization of the proximal airways observed in most patients in the ICU.²⁰ Quantitative culture techniques suggest that endotracheal aspirate cultures (QEA) may have an acceptable overall diagnostic accuracy, similar to that with several other, more invasive techniques including BAL, protected BAL (pBAL) ,protected specimen brush (PSB) or tracheobronchial aspirate(TBA).^{7,19,20} Threshold values often employed for diagnosing pneumonia by quantitative cultures are $\geq 10^5$ to 10^6 , ≥10⁴, and ≥10³ CFU/ml for QEA, bronchoscopic BAL, and PSB, respectively, with $\geq 10^5$ CFU/ml being the most widely accepted value for QEA.^{21,22,23} Also, blind aspiration sampling can lead to errors but bronchoscope also carries risks, such as inducing cardiac arrhythmia, hypoxemia, bleeding, pneumothorax, along with greater costs both in terms of time and resources. It is accepted that before administering the first dose of antibiotic or before any change in treatment patient specimens for culture should be taken, so that the results interpreted are valid.²⁴ Lalwani et al., in their study, observed

that culture results of a properly collected tracheal aspirate should be taken into consideration along with Centre for Disease Control and Prevention (CDC's) diagnostic criteria to maximize the diagnosis of VAP.²⁵

The recent guidelines of Society for Healthcare Epidemiology of America/ Infectious Diseases Society of America (SHEA/IDSA) recommend Gram staining of endotracheal aspirates. However, the sensitivity (57-95%) and specificity (48-87%) of this technique are highly variable. The role of procalcitonin and other biomarkers for the diagnosis of VAP is yet unsubstantiated.^{5,26}

Since VAP diagnosis founded on radiographic findings of pneumonia, which have intrinsic variability in technique, interpretation, and reporting, and on clinical signs and symptoms- that are subjective- in 2011 a Working Group of the CDC proposed a new approach to surveillance for Ventilator-Associated Events (VAE). Table 1 According to the new CDC definition algorithm, VAP is an Infection-related Ventilator-Associated Complication (IVAC) occurring after 3 days of mechanical ventilation and 2 days before or after the onset of worsening oxygenation, if purulent respiratory secretions with positive cultures or objective signs of respiratory infection have been found.²⁷

STRATEGIES FOR VAP PREVENTION

There are multiple recommended measures for prevention of VAP. Practices for which insufficient evidence or no consensus exists about efficacy are summarized in Table 2. Preventive VAP strategies can be grouped into two classes: non-pharmacologic strategies, which are focused on preventing aspiration, and pharmacologic strategies, which are aimed at preventing colonization.

Non-Pharmacologic Strategies

Staff Education in the Intensive Care Unit

Various barriers to adhering to VAP prevention recommendations include disagreement with the reported results of source studies, resource paucity, elevated costs, inconvenience for nurses, fear of potential adverse effects and patient discomfort. There is considerable variability in practice between countries regarding humidification systems, intubation route, endotracheal suction system, kinetic therapy beds, subglottic secretion drainage and body position. For efficient patient care staffing must be sufficient while ensuring that staff is able to comply with essential infection control practices and other prevention strategies.^{17,28}

Hand Hygiene

Microorganisms can be spread easily from patient to patient on the hands of healthcare workers. Moreover, wrist watches, rings, bangles and other jewelry commonly act as reservoirs for organisms, and impede effective hand cleaning. Moreover, healthcare workers compliance to hand hygiene is low, and high workload decreases their compliance.²⁹

Impact of patient position

Patients positioned semi-recumbently 45 degrees have significantly lower incidence of clinically diagnosed VAP compared to patients positioned supinely.³⁰ Moreover, the incidence of clinically diagnosed VAP among patients positioned prone, does not differ significantly from the incidence of clinically diagnosed VAP among patients positioned supine.^{31,32}

Kinetic Beds

Critical patients often for a long time remain immobile in the supine position so the functional residual capacity is decreased because of alveolar closure in dependent lung zones and impaired mucociliary clearance. This leads to the accumulation of mucus, atelectasis onset and ensuing infection.³³ Rotational therapy uses a special bed designed to turn continuously, or nearly continuously, the patient from side to side; specific designs include kinetic therapy and continuous lateral rotation therapy (CLRT).^{34,35}

Artificial Airway Management

Oral vs Nasal Intubation: Both nasogastric and nasotracheal tubes can cause oropharyngeal colonization and nosocomial sinusitis. Thus, use of the oral route for both endotracheal and gastric intubation should be considered to decrease the risk of VAP.³⁶

Endotracheal tube cuff pressure: The secretions that pool above inflated endotracheal tube cuffs may be a source of aspirated material and ensuing VAP. The pressure of the endotracheal tube cuff should be optimized in order to prevent the leakage of colonized subglottic secretions into the lower airways. Persistent pressures into the tube cuff below 20 cm H_2O have been associated with the development of VAP.³⁷

Silver-Coated Endotracheal Tubes: Silver-coated endotracheal tubes appear to be safe, reduces bacterial biofilm formation, has bactericidal activity, reduces bacterial burden and can delay airway colonization. However, further studies are needed to for determing its efficacy.^{38,39}

Mechanical Ventilation Management

Ventilator Circuit Change: The CDCs recommendation was 'do not change routinely, on basis of duration of use, the breathing circuit that is in use on an individual patient. Change the circuit when it is visibly soiled or mechanically malfunctioning.⁴⁰

Humidification With Heat and Moisture Exchangers: The effect of HME in preventing VAP is still controversial and recent studies have failed to show a significant difference in rates of infection. $^{\rm 41}$

Subglottic secretion drainage: Intermittent subglottic secretions drainage using inspiratory pause during mechanical ventilation results in a significant reduction in VAP.⁴² SSD reduces VAP in patients ventilated for >72 hours and should be considered with other recommended strategies such as semi-recumbent positioning.⁴³

Pharmacologic Strategies

Modulation of Oropharyngeal Colonization

Policies encouraging routine tropical oral decontamination with chlorhexidine for patients merit reevaluation. It is a cheap measure, but whether is it a safe one – it does not select resistant microorganisms – remains to be investigated.^{8,44}

Selective Decontamination of the Digestive Tract

Selective decontamination of the digestive tract (SDD) is the decontamination of potentially pathogenic microorganisms living in the mouth and stomach, whilst preserving the indigenous anaerobic flora. SDD is an effective and safe preventive measure in ICUs where incidence rates of MRSA and VRE are low, but in ICUs with high rates of multi-resistant microorganisms it is a measure that is effective but not safe.^{45,46}

Stress Ulcer Prophylaxis

Patients at risk from important gastrointestinal bleeding (shock, respiratory failure requiring mechanical ventilation or coagulopathy) should receive H_2 antagonists such as ranitidine rather than sucralfate.⁴⁷

Ventilator sedation protocol

In patients receiving mechanical ventilation and requiring sedative infusions with midazolam or propofol, the use of a nurse-implemented sedation protocol decreases the rate of VAP and the duration of mechanical ventilation.⁴⁸ An objective assessment-based Analgesia-Delirium-Sedation (ADS) protocol without daily interruption of medication infusion decreases ventilator days and hospital length of stay in critically ill trauma patients.⁴⁹

Antibiotic Policy and Infection Control

Rational antibiotic policy is a key issue for better patient care and preventing antimicrobial resistance.^{50,51} Infection control programs like using a scheduled switch of antibiotic class have demonstrated efficacy in reducing nosocomial infection rates and restraining multidrug resistant (MDR) microorganism emergence.⁵²

VAP prevention in low resource/developing countries

Though the incidence of VAP has declined in the developed countries, it continues to be unacceptably high in the developing world. Its incidence in these countries is 20 times that in the developed nations with significant morbidity, mortality, and increase in ICU length of stay, which may represent an additional burden on the scarce resources in developing countries.53 Insufficient preventive strategies and probably inappropriate antibiotics administration may have lead to this scenario. Since microbiology and resistance pattern in India is different from other countries, there is need for data from our country to choose appropriate antimicrobials for management.54 Simple and effective preventive measures can be instituted easily and at minimal costs. Such measures might include hand hygiene, diligent respiratory care, elevation of head, oral and not nasal cannulation, minimization of sedation, institution of weaning protocols, judicious antibiotics use, deescalation, and leveraging PK/PD characteristics for antibiotics administered. More costly interventions should be reserved for appropriate situations. Strategies to prevent VAP, probably by emphasis on practical, low-cost, low technology, easily implemented measures is need of the hour.

Ventilator-associated events (VAE) surveillance: an objective patient safety opportunity

Surveillance for ventilator-associated pneumonia is challenging and contains many subjective elements, including the use of chest x-ray evidence of pneumonia. In January 2013, CDC convened a VAP Surveillance Definition Working Group which transitioned VAP surveillance to ventilator-associated event (VAE) surveillance in adult inpatient settings.⁵⁵ The VAE algorithm—which is a surveillance algorithm and not intended for use in the clinical management of patients-consists of 3 tiers of definitions: Tier 1, Ventilator-Associated Conditions (VAC); Tier 2, Infection -related Ventilator-Associated Complications (IVAC); and Tier 3, Possible and Probable VAP.27 The tier 1, VAC attempts to identify sustained respiratory deterioration episodes, and capture both infectious and noninfectious conditions and complications occurring in patients receiving mechanical ventilation. The tier 2, IVAC, is intended to identify the subset of VACs that are potentially related to pulmonary and extra pulmonary infections of sufficient severity to trigger respiratory deterioration. The tier 3, possible and probable VAP, attempts to identify IVAC patient subsets with respiratory infections as manifested by objective evidence of purulent respiratory secretions (where purulence is defined by using quantitative or semi-quantitative criteria for the number of neutrophils on Gram stain) and/or positive results of microbiological tests done on respiratory specimens. Because of the wide range of the lower respiratory tract specimens, their collection procedure as well as in laboratory processing and reporting of results, the Working Group of CDC determined that it was not appropriate to include these data elements in the VAC and IVAC definitions.56

This 3 tier approach is ineffective to accurately identify VAP for surveillance purposes and focuses on more mechanical ventilation complications. This approach may also reduce the likelihood of manipulation that could artificially lower event rates. Most VAEs are caused by pneumonia, pulmonary edema, atelectasis, or acute respiratory distress syndrome. In few recent studies concordance between the VAE algorithm and VAP was found to be poor.⁵⁷ Thus, more studies are needed to further validate VAE surveillance compared with conventional VAP by using strong microbiologic criteria, particularly bronchoalveolar lavage with a protected specimen brush for diagnosing VAP and to better characterize the clinical entities underlying VAE.

Bundle approach to prevention of VAP

One of the five goals of the 'Saving 100,000 Lives' campaign, launched by the Institute for Healthcare Improvement is to prevent VAP and deaths associated with it by implementing a set of interventions for better patient care known as the 'ventilator bundle'. The interventions should have scientific support of effectiveness, based on randomized controlled trials. All the elements of the bundles must be executed at the same time. The bundles for VAP includes four components: (a) elevation of the head end of the bed to 30-45°, (b) daily interruption of sedation, (c) daily assessment of readiness to extubate and (d) prophylaxis for deep venous thrombosis and peptic ulcer disease. The bundle approach to prevention of VAP has been found to be highly effective in reducing the incidence, mortality and ICU stay.^{5,58,59} The ventilator bundle should be modified and expanded to include specific processes of care that have been definitively demonstrated to be effective in VAP reduction. A multidimensional framework with a long-lasting program can successfully increase compliance with preventive measures directly dependent on healthcare workers bedside performance.

CONCLUSION

Ventilator Associated Pneumonia is one of the most common nosocomial infections in ICU presenting with nonspecific symptoms and clinical signs. Quantitative culture obtained by different methods, including EA, BAL, pBAL, PSB or TBA seem to be rather equivalent in diagnosing VAP. Clinical criteria used in combination, may be useful in VAP diagnosis; however, inter-observer variability and the moderate performance are to be considered.

Preventive strategies should focus on better secretion management and on reduction in bacterial colonization. Further research on targeted interventions is needed to effectively reduce VAP incidence. For VAP an approach based on multidisciplinary group is required including setting preventive benchmarks, establishing goals and time lines and providing appropriate education and training, audits and feedback to the staff, while continually updating themselves based on relevant clinical and preventive strategies. Acknowledgements NIL Competing Interests None declared Author Details VARUN GOEL MD Microbiology, AIIMS, New Delhi, India; SAVITA GUPTA MD Anaesthesia, LNJP, New Delhi, India; TARUN GOEL MRCP, HOLY FAMILY HOSPITAL, New Delhi, India. CORRESPONDENCE: Dr Varun Goel, Senior Resident, Clinical Microbiology division, Department of Laboratory Medicine, AIIMS, New Delhi-110029. Email: drvarun21@gmail.com

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Tuberculosis presenting as Costochondritis: a rare case report and brief review of literature

Manzoor Ahmad Wani, Naveed Nazir Shah, Syed Quibtiya Khursheed, Khurshid Ahmad Dar, and Asma Bashir

Abstract

Mycobacterium tuberculosis can affect almost any part of the body. Although tuberculosis of the bones is well known, tuberculosis involving the cartilages is rarely described. We report a 30 year male, who presented with insidious onset pain and swelling of the right lower parasternal area which on evaluation was diagnosed as tubercular infection of costochondral junction. The patient had no evidence of tuberculosis anywhere else in the body. Thoracic wall tuberculosis is rare and primary tubercular costochondritis has been very rarely reported in the literature.

Keywords: Mycobacterium tuberculosis

Abbreviations: ESR - Erythrocyte Sedimentation Rate, ECG - Electrocardiogram, AFB - =Acid Fast Bacilli CT=Computed Tomography FNAC=Fine needle aspiration Cytology

Introduction

Tuberculosis is an important and major infectious disease worldwide, especially in developing countries with an estimated global case fatality rate of 13% in 2007. The World Health Organization estimated that there were 13.7 million prevalent cases of TB infection worldwide, with each year bringing about 9.27 million new cases, 44% of which are new smear-positive cases¹. Musculoskeletal tuberculosis is rare, chest wall tuberculosis is rarer and involvement of costochondral junction is among the rarest forms of tuberculosis. Tubercular costochondritis usually presents with insidious onset nonspecific pain and swelling, resulting in delay in the diagnosis. Diagnosis is usually made by typical radiological findings and microbiological and histological evidence of tuberculosis. Treatment consists of antitubercular therapy with or without surgery.

Case report

30 year male, smoker, from low socio economic status presented with history of low grade fever, malaise and anorexia which began gradually two months back. For about one month he had pain in right side of chest just adjacent to lower part of sternum. The pain had started insidiously, gradually worsened with time, and was dull and aching in character. Pain was localized to the right lower parasternal area, occasionally radiating to the back. The pain was aggravated by physical activity and deep inspiration and was relieved to some extent by ordinary anti- inflammatory medications. There was significant history of pulmonary tuberculosis in the patient's sister 1 year

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ago. There was no history of cough, haemoptysis, fever with chills or history of tuberculosis in the past.

On general physical examination, the patient was weak and febrile. On local examination, there was a bulge in the right lower parasternal area, corresponding to the right 9th costochondral junction. On palpation, there was severe tenderness in the same area. There was no peripheral lymphadenopathy and abdomen was soft and non-tender with no organomegaly. Chest examination was unremarkable. The rest of the examination was normal.In terms of investigations, the chest radiograph, ECG, haemogram, kidney function tests and liver function tests were normal. ESR was high (34), Mantoux test was positive(15mm). Sputum for AFB was negative. Axial CT chest demonstrates expansion of the left 9th costal cartilage with soft tissue thickening on both the inner and outer aspect of the cartilage (Fig.1). FNAC (Fine Needle Aspiration Cytology) of the costochondral junction revealed Mycobacterium tuberculosis and on culture and histopathology of aspirated material revealed tubercular granuloma (Fig.2). A final diagnosis of tubercular costochondritis was made and the patient was treated with anti tubercular drugs for 9 months. Patient's symptoms improved after 2 weeks of treatment and swelling and tenderness subsided. Post treatment axial CT demonstrated complete resolution of soft tissue abnormality previously seen around the costal cartilage (Fig.3).

Discussion

Tuberculosis is very common infectious disease in developing countries like India, resulting in significant morbidity and



Figure 1: CT chest showing evidence of costochondritis.



Figure 2: Typical tubercular granuloma with central caseous necrosis on histopathology.



Figure 3: Post ATT CT showing complete resolution of costochondritis.

mortality. Musculoskeletal tuberculosis is relatively uncommon and accounts for 1 to 2% of all the tuberculosis patients^{2,3}and accounts for about 10% of all extrapulmonary TB infections⁴. Tuberculosis of the chest wall constitutes 1 to 5% of all cases of musculoskeletal TB^{5,6}. TB abscesses of the chest wall are usually seen at the margins of the sternum and along the rib shafts, andcan also involve the costochondral junctions, costovertebral joints and the vertebrae⁷. In one study⁸, on the basis of the part of the rib involved, the roentgenographic findings for patients with rib tuberculosis was divided into four categories: Costovertebral (35%), Costochondral (13%),Shaft (61%), and Multiple cystic bone. TB of the thoracic wall is usually caused by reactivation of some latent foci of primary tuberculosis formed during hematogenous or lymphatic dissemination but direct extension from contiguous mediastinal lymph nodes can also occur⁹. In developing countries such as ours, tuberculosis is endemic and all the rare forms of the disease have been described, but in developed countries, resurgence of tuberculosis due to HIV may be responsible for atypical presentations .

Thoracic wall tuberculosis mostly presents insidiously with pain and swelling, but the diagnosis of chest wall TB is often delayed due to lack of specific symptoms and signs and gradual course¹⁰. Approximately less than 50% of chest wall TB patients may have active pulmonary TB^{11,12}. Imaging techniques like X-Rays and CT scan play an important role in diagnosis and follow up of these patients. According to a study done by Vijay YB et al¹³, radiological signs may not be present initially at the time of presentation with symptoms, abscesses or sinuses may be present much before the imaging modalities detect them. Computed tomography (CT) scan is more valuable for localization and detection of bone destruction and soft tissue abnormalities. Atasoy et al demonstrated the role of Magnetic Resonance Imaging (MRI) for early detection of marrow and soft tissue involvement in sternal tuberculosis due to high contrast resolution of MRI14. Diagnosis is usually confirmed by finding acid fast bacilli (AFB) and positive AFB cultures of bone (positive in up to 75% of cases), and caseous necrosis and granuloma on histopathology¹¹.

Complications of thoracic wall tuberculosis include secondary infection, fistula formation, spontaneous fractures of the sternum, compression or erosion of the large blood vessels, compression of the trachea and migration of tuberculosis abscess into the mediastinum, pleural cavity or subcutaneous tissues as discharging sinus. Chest wall TB needs to be differentiated from benign and malignant tumors [chondroma, osteochondroma, fibrous dysplasia, lipoid granuloma, chondrosarcoma, myeloma multiplex]¹¹, metastatic carcinoma, lymphoma or other kinds of infection^{15,16}.

The treatment of choice of chest wall TB is still not clear. Whether antitubercular therapy alone or surgical debridement (or excision based on lesion extension) combined with antitubercular therapy should be done needs further studies. But the general rule is if there are any complications, surgery is the treatment of choice followed by antitubercular therapy. We conclude that the diagnosis of thoracic wall tuberculosis is a challenge for physicians and is suspected by gradual onset clinical features and confirmed by microbiology, histopathology and radiography findings. Early diagnosis and treatment are important to prevent complications caused by bone and joint destruction.

Competing Interests

None declared

Author Details

MANZOOR AHMAD WANI, DM resident, Department of Gastroenterology, SKIMS, Srinagar, India. NAVEED NAZIR SHAH, Assistant professor, Chest Diseases Hospital, Government Medical College, Srinagar, India. SYED QUIBTIYA KHURSHEED, Registrar, Department of General Surgery, Government Medical College, Srinagar, India. KHURSHID AHMAD DAR, Lecturer, Chest diseases hospital, Government Medical College, Srinagar, India. ASMA BASHIR, PhD scholar, Kashmir University, Srinagar, India. CORRESPONDENCE: MANZOOR AHMAD WANI, MBBS, MD, DM resident, Department of Gastroenterology, SKIMS, Srinagar, India.

Email: drmanzoorahmadwani@gmail.com

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Musculoskeletal training in Rheumatology - What the trainees think

Kavitha Nadesalingam, Eleana Ntatsaki, Dobrina Hull & Rod Hughes

Abstract

One in four adults are affected by longstanding musculoskeletal (MSK) problems, which are responsible for up to 30% of GP consultations. With a move towards providing rheumatology services in the community there is need for rheumatology trainees to become competent in diagnosing and managing MSK conditions. Rheumatology trainees have expressed the anecdotal view that training in MSK is compromised, partly due to the reduction of referrals of MSK conditions to secondary care and partly due to the focus on more complex inflammatory conditions.

A survey was carried out on behalf of the Rheumatology Specialist Advisory Committee, to assess rheumatology trainees' confidence and ability in dealing with MSK conditions during, and on recent completion of training. The survey was sent to the rheumatology trainee representative of each LETB, to be disseminated to rheumatology trainees in their region. 77 responses from a total of an estimated 223 trainees were received. 20 of these surveys were incomplete, with not all questions being answered. Responses from trainees across all career grades from ST3 to 2 years post Certificate of Completion of Training were received.

92% thought MSK medicine to be an important part of rheumatology training; 64% had managed patients with soft tissue pathology on a daily basis; 30% felt they managed MSK conditions on a weekly basis; 32% of trainees felt they were not yet confident in diagnosing and distinguishing between different types of soft tissue pathologies; 16% felt they were lacking in competency for their level of training in managing MSK pathologies as outlined in the JRCPTB 2010 rheumatology curriculum; the majority of trainees felt they were either partially competent in all, or some areas, satisfactory for their level of training; 67% felt their training in injection techniques had been at least 'adequate'. Exposure to, and experience with MSK medicine in current jobs and throughout training ranged from poor to excellent.

Within this limited survey, the views of 77 trainees have shown that training in MSK could be improved at all levels. Although trainees felt they were lacking confidence in dealing with certain areas of MSK medicine, when competencies were mapped out to the rheumatology curriculum, trainees felt they were achieving appropriate competency for their level of training. Trainees were keen to have further MSK training specifically in sports medicine. Free text comments for ways to improve skills repeatedly mentioned shadowing physiotherapists and exposure to more teaching and supervision focusing on examination techniques.

With changes in the nature and geography of rheumatology services we feel these aspects of training should not be overlooked to ensure trainees are equipped to deal independently with MSK conditions by completion of training.

Keywords: Musculoskeletal medicine, rheumatology training, medical education and training

Abbreviations: MSK - musculoskeletal

One in four adults are affected by musculoskeletal (MSK) problems, which account for up to 30% of General Practice (GP) consultations in the United Kingdom..¹ Some GPs have direct access to community MSK services, but when not available, referrals are made to secondary care departments such as rheumatology. MSK training involves the skills that a rheumatologist needs to achieve competencies in the diagnosis and treatment of soft tissue rheumatism as opposed to inflammatory rheumatic joint disease.

It has been reported that junior doctors in the United Kingdom fail to routinely screen for MSK conditions on admission onto general medical or surgical wards² which may be reflective of training issues. It was in our anecdotal opinion that MSK training at higher specialist training was being compromised as well. Within the United Kingdom doctors in training typically begin work as a first year rheumatology trainee four years after graduation from medical school following completion of both a two year foundation programme (encompassing a generic training programme which forms the bridge between medical school and specialist/general practice training) and a two year Core Medical Training programme, (involving 2 years of training, undertaking between four and six rotations in different medical specialites). At the time of writing, higher specialty training, such as in rheumatology, began at the level of Specialist Trainee 3 (ST3) and was either a four year training programme or a 5 year training programme if trainees were dually accrediting in general medicine.³Higher specialist training involves rotating through different rheumatology departments within each Local Education Training Board (LETB).

In our opinion, the basic MSK skill set is essential to the training of a competent rheumatologist and trainees gain overall MSK competencies within routine clinical practice as they rotate through different hospitals during training. However, in some training programmes, there is very little MSK training opportunities, as MSK centres operating in the community in the United Kingdom, mean that these patient groups are not being treated in training hospitals. Faculty in these centres are competent to train, but training opportunities in MSK centres are reduced.

Rheumatology registrars in-training have expressed the anecdotal view that MSK training may be compromised, partly due to the reduction of referrals to secondary care and partly due to the inevitable focus on training in the more complex inflammatory conditions.

Rheumatology trainees in the UK were surveyed in 2015 on behalf of the Rheumatology Specialist Advisory Committee to assess confidence and ability in dealing with MSK conditions during and on recent completion of training. The survey was disseminated to rheumatology trainees via the trainee representative from each LETB.

77 responses were received across 15 LETBs from a total of an estimated 223 trainees. 20 of these surveys were incomplete, with not all questions being answered but those questions answered were considered in the results of this survey. Responses from trainees across all career grades from ST3 (1st year of specialist training) to 2 years post Certificate of Completion of Training were received.

58 out of 63 doctors (92%) thought MSK medicine to be an important part of rheumatology training. Free text comments recognised that MSK conditions were frequently referred to rheumatology and differentiating between inflammatory and non-inflammatory pain is important.

Only 41 out of 64 doctors (64%) felt they managed patients with soft tissue pathology on a daily basis and 20 out of 63 (32%), felt they were not yet confident in diagnosing and distinguishing between different types of soft tissue pathologies.

Exposure to, and experience with MSK medicine in current jobs and throughout training ranged from poor to excellent.

Only 9 out of 58 trainees (16%) felt they were lacking in competency for their level of training in managing the MSK pathologies outlined in the Joint Royal Colleges of Physicians Training Board (JRCPTB) 2010 rheumatology curriculum. The majority of trainees felt they were either partially competent in all, or some areas, satisfactory for their level of training. Interestingly, only 39 out of 58 trainees (67%) felt their training in injection techniques had been at least 'adequate'. Some trainees mentioned they had been self-taught in some injection procedures and training had been limited in certain soft tissue injections (most commonly plantar fasciitis, tendon sheath and elbow enthesis injections).

This survey has limitations in that the numbers of trainees surveyed were small. However, our total response number considering the usual poor response rate for online surveys is reasonable. Our survey was not validated and it is likely that there will be an element of selection bias in the responses received.

However, one of the strengths of our survey is the ability to review responses by seniority. We analysed further the confidence rating according to training level grade and we looked into two main subgroups, the more junior trainees (ST3 and ST4s) and the more senior trainees (ST6 and ST7). As expected the more junior cohort rated their confidence slightly lower compared to the more experienced group. Within the junior group (n=17) only 41% suggested they felt confident for their level of training when generically asked about their general diagnostic skills on MSK, which improved to 59% when this question was mapped to the curriculum. In the senior group of ST6 and ST7 (n=25), the confidence levels were significantly higher (80% felt confident appropriate to their level of training) and there was no change in confidence levels when skills were mapped to the curriculum. (Table 1). This may reflect the natural increase in experience and exposure to MSK medicine with progression in training, but also the better understanding of the curriculum requirements by the more senior trainees. Only one fully completed survey was received from a rheumatologist post Certificate of Completion of Training making this subgroup too small for further analysis.

	(n)	Q6) Confidence in dealing with MSK	% Q6	Q9) Confidence mapped to curriculum	% Q9
ST3 and ST4- junior	17	7	0.41	10	0.59
ST6 and ST7- senior	25	20	0.8	20	0.8

Q6) How confident do you feel in diagnosing and distinguishing between different types of soft tissue pathologies/MSK in your daily practice? Q9) Do you feel competent in diagnosing and managing the above MSK pathologies outlined in the 2010 rheumatology curriculum?

Within this limited survey, the views of 77 trainees have shown that training in MSK could be improved for rheumatologists in training at all levels. Although trainees felt they were lacking confidence in dealing with certain areas of MSK medicine, when competencies were mapped out to the rheumatology curriculum, trainees felt they were achieving appropriate competency for their level of training although this was not assessed objectively.

The trainees' perception of the level of competency needed in dealing with MSK conditions seemed to overestimate the requirement of the 2010 rheumatology curriculum. In clinical practice, trainees may feel they encounter different MSK pathologies, which they are being expected to manage which are not being given sufficient emphasis within their curriculum. Further questioning in this area may conceivably lead to adjustments within the curriculum and the training programmes.

In particular, to improve training in MSK medicine, rheumatology trainees valued teaching from physiotherapists and being able to attend specialist sports medicine clinics. Trainees who had 'independently' taken time to gain experience in this way felt that their training had benefitted. To support trainees in achieving these competencies it may be worthwhile adding a prerequisite in the Annual Review of Career Progression (ARCP) process (a formal method in UK medical training by which a trainee's progression through their training programme is monitored and recorded) to ensure dedicated time is set aside for this aspect of MSK rheumatology training. Completion in a range of direct assessments such as Clinical Evaluation Exercises (miniCEX), and DOPs (Directly Observed Procedures) may ensure competency in this aspect of rheumatology training as well as secure confidence in dealing with MSK conditions and soft tissue pathology.

With changes in the nature and geography of rheumatology specialist services we feel these aspects of rheumatology training should not be overlooked so trainees are equipped to deal with MSK conditions independently by their completion of training.

Competing Interests None declared Author Details Dr KAVITHA NADESALINGAM, MBChB, MRCP (Rheumatology), Leeds Teaching Hospitals NHS Trust, Chapel Allerton Hospital, Leeds, LS7 4SA, UK. ELEANA NTATSAKI Norfolk and Norwich University Hospital, Department of Rheumatology, Colney Lane, Norwich, NR4 7UY, UK. DOBRINA HULL, Queen ELizabeth Hospital, Rheumatology, Stadium Road, Wooliwch, London SE18, UK. ROD HUGHES, Ashford and St Peter's Hospital Trust, Rheumatology, St Peters Hospital Guildford Road, Chertsey, KT16 OPZ, UK. CORRESPONDENCE: KAVITHA NADESALINGAM, Chapel Allerton Hospital, Chapeltown Road, Chapel allerton, Leeds, LS7 4SA, UK. Email: kavitha nades@hotmail.com

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How to Run a Mock CASC

Heather Welsh

Abstract

This paper describes the process followed in the West of Scotland to organise a local mock exam to support trainees with their preparation for the CASC (Clinical Assessment of Skills and Competencies), the final MRCPsych examination. The reader is taken through the necessary steps, including initial practicalities- building the organising team, deciding the venue and exam date; setting the mock exam format; writing the stations; recruiting actors and examiners; coordinating the mock exam on the day and overcoming potential problems. With an enthusiastic and organised team on board, we have found it possible to run a realistic mock CASC at a local level, at low financial cost.

Keywords: Training, MRCPsych, CASC

Introduction

The CASC (Clinical Assessment of Skills and Competencies) has been running since 2008 and is the final membership examination for the Royal College of Psychiatrists (MRCPsych).¹ It is a clinical examination and follows an OSCE format (Objective Structured Clinical Examination), where candidates move through 16 short stations.^{2,3} We have been running a mock CASC in the West of Scotland for the last few years and have received consistently good feedback from candidates. This article describes our experience of organising the mock exam.

Step 1: Practicalities

The organising committee

Our mock CASC is arranged by the organising committee for the local core psychiatry education programme (MRCPsych course). This committee is comprised of a consultant chair, higher trainee chair and one or two trainee representatives from each higher subspecialty and each core training level. The higher trainee chair takes the lead with organising the mock, with the support of other committee members. This works well, as the trainees have recent experience of sitting or preparing for the exam and are enthusiastic about medical education.

Support from our postgraduate operations manager is invaluable. She works closely with the committee to book the venue and actors, and order equipment such as screens and a bell. She also has a key role in advertising the mock exam to trainees, booking places and being a point of contact for candidates. She assists with set up on the day of the exam and prints station instructions, marking schemes and labels for candidates.

Venue

Our mock exam is held in the same venue as our core trainee educational programme. We have 2 rooms to use for stations and a waiting area for candidates. Screens are borrowed from Glasgow University Medical School to create separate stations.

<u>Timing</u>

The mock exam takes place around 2 weeks before the CASC. This enables candidates to have prepared for the exam and leaves some time to work on any issues identified by the mock. Planning usually starts 4-5 months in advance of this, with increasing intensity and time commitment as the exam approaches.

Step 2: Mock Exam Format

CASC format and blueprint

The CASC itself includes morning and afternoon circuits, which all candidates will move through. There are 16 stations in total, with 90 seconds between each to read the task instructions. The morning session comprises 4 pairs of 'linked' stations, lasting 10 minutes each. In these paired stations, the second station is connected to the first in some way, such as taking a history in the first part then discussing with a family member in the second. Each station is marked independently. The afternoon consists of 8 single stations, lasting 7 minutes each. A passing list is posted online after a few weeks, with specific feedback made available to unsuccessful candidates.²

Mock CASC format

Our mock CASC is run in one afternoon session from 1.30-5pm. We have been able to include 16 stations by running the 2 circuits simultaneously. To make this possible, each station is 7 minutes in duration, with 90 seconds between stations. 4 candidates start after a delay, as it is not possible to start on part 2 of a linked station. Trainees are allocated candidate numbers and starting stations for both circuits to coordinate this effectively (figure 1). 16 candidates can take part in the mock exam.

Figure 1. Candidate numbers

Candidate	Number	1st loop starting	2nd loop starting
Name		station	station
	1	la	5
	2	2a	6
	3	3a	7
	4	4a	8
	5	1a (8.5 min delay)	9
	6	2a (8.5 min delay)	10
	7	3a (8.5 min delay)	11
	8	4a (8.5 min delay)	12
	9	5	la
	10	6	2a
	11	7	3a
	12	8	4a
	13	9	1a (8.5 min delay)
	14	10	2a (8.5 min delay)
	15	11	3a (8.5 min delay)
	16	12	4a (8.5 min delay)

At least 3 other higher trainee helpers are recruited to assist the coordinator on the day of the exam. The same marking scheme is used for each station, covering domains common to all stations, such as building rapport and range and depth of questioning. There is also space for specific feedback, which examiners are encouraged to provide, though they do not interact with candidates directly during the exam. Forms are completed contemporaneously and distributed to candidates immediately after the mock exam.

Step 3: Writing the Stations

The content of the CASC follows a blueprint, which is available through the RCPsych website. A variety of skills are tested during the 16 stations of the exam, including history-taking, mental state examination, risk assessment, cognitive examination, physical examination, case discussion and difficult communication.³ We refer to the blueprint when selecting which stations to include in the mock. Each year, recent CASC candidates are asked to suggest stations and we combine these with previous stations to construct the mock exam. New stations are written by the trainee who suggested them, including candidate instructions and actor's notes. The higher trainee organiser formats these to maintain consistency across the mock exam.

Role-play actors

For our most recent mock CASC, we employed paid actors for every station. These actors are part of a local agency which has experience in working as simulated patients for Glasgow University exams and communication skills sessions. In previous years, we have recruited a combination of core/higher trainees and actors. We have found pros and cons to each approach. The use of paid actors was more realistic for trainees but writing scripts proved more challenging as instructions required greater detailed in relation to specific psychiatric information, such as how a person with mania may present.

Step 4: Recruiting Examiners

There are a number of local consultant psychiatrists who are actively involved in teaching. They are supportive of the mock CASC and enthusiastic about examining stations. After the stations have been devised, consultants are invited to examine based on their areas of expertise. Higher trainees with particular interest in education are then asked to examine any remaining stations. Candidate instructions and actor's notes are circulated to examiners in advance (figure 2). A simple guide to the mock exam is also sent to any new examiners. As we use the same marking scheme for each station, it is down to the experience of the examiner to consider whether the candidate has addressed the specific tasks appropriately.

Figure 2. Station template

Station	Title	Actor	Examiner	Written?	Sent?
1a					
1b					
2a					
2b					
3a					
3b					
4a					
4b					
5					
6					
7					
8					
9					
10					
11					
12					

Step 5: The Day of the Mock Exam

The higher trainee coordinators arrive at least 1.5 hours prior to the start time to set up the venue. Examiners, actors and candidates are asked to arrive 15-30 minutes before the scheduled start time. Each group is briefed on the exam format and given the opportunity to ask questions. Actors and examiners are shown to their stations and allowed time to discuss them. Candidates are provided with numbered labels to wear, for examiners to record on their marking sheets. The 4 candidates who will be starting later are asked to wait, while the others are shown to the examination rooms. They are shown which station they will be starting at, then queue in order at the door.

The mock exam coordinator stands where they can be heard by both rooms. There are 1 or 2 helpers in each room to guide the candidates around the circuit. The bell is rung to signify the start of the exam, the end of the 90 second preparation time (the start of each station), 1 minute warning and the end of each station. The candidates who were allocated to start later are brought into the circuit and shown to their station as the 'end of station' bell is rung, as this also signifies the start of the 90 second preparation time for the next station.

Marking schemes are collected and sorted during the break. Candidates are not kept separate from examiners, actors or each other. They are advised that they will get the most out of the afternoon if they don't discuss the stations but this is ultimately their choice.

Examiners and actors return to their stations following the short break and candidates swap between circuits. Following the second round, there is another short break. Actors are excused at this point and most examiners remain for a feedback session. Marking schemes are collected, sorted and distributed to candidates. One room is re-set for group feedback. Examiners are thanked for their time and each is asked in turn for general feedback, hints and tips on their station (figure 3).

Figure 3. Mock CASC timing

11.30pm	Coordinators arrive & set up venue
12.30-12.45pm	Candidates, actors & examiners on site
1pm	Exam starts
2.15pm approx	Break
2.45pm	Exam re-starts - candidates switch circuits
4pm approx	Exam ends
4.30pm	Feedback forms distributed/ group feedback session
5pm	End

Overcoming Potential Problems

Examiners

Our examiners are all either higher trainee or consultant psychiatrists. It is therefore possible that unforeseen circumstances mean that they may have to cancel at very short notice, attend late or not at all, or be called away during the mock exam. Each of these has happened over the past few years but has been easily managed by the extra higher trainee helpers stepping in to examine a station.

Actors

All of our actors have attended as planned. If a paid actor has to cancel at short notice, the agency will find a replacement. If a trainee actor did not attend, one of the higher trainee helpers could step in. Another potential problem which we have encountered is actors not performing as intended. This can be minimised by preparing clear instructions for actors, with examiners providing some direction if needed.

Quality control of stations

It is difficult to know how a station will work until it is used in the mock exam. To minimise the risk of problems, stations are checked and formatted before the exam. They are circulated to actors and examiners in advance to allow time for them to raise any concerns and clarify any uncertainties. Despite following these processes, there are some stations which appear unclear or do not run smoothly on the day of the mock exam. It is helpful to receive feedback from examiners, so that stations can be amended or avoided in future.

Timing

Our mock exam follows a very tight schedule. If the mock exam itself overruns, then fewer examiners may be able to remain to provide feedback. The higher trainee coordinator should keep time carefully during the day of the mock exam, particularly during break times, which are very brief. Support from other higher trainee helpers is essential for this, in working together to collect and organise marking sheets and guiding examiners, actors and candidates to stations. Late arriving examiners remain a potential problem due to their other commitments. We provide a sandwich lunch to our examiners prior to the exam, which helps with prompt attendance.

Venue

The venue we use is quite cramped and can become noisy. We have access to only 14 screens to divide the 16 stations so they are close together and those at the ends of the room are not fully enclosed. The screens are thin so only muffle the noise from neighbouring stations. These issues of space and noise are difficult to overcome. Trainees are warned in advance and aim to focus on their own station as much as possible.

Recruiting actors, examiners and candidates

To date, we have not experienced any problems in recruiting actors, examiners or trainee helpers. We have been able to fill all candidate places and often have a waiting list. If necessary, the mock exam could be run with fewer stations and still provide helpful practice for trainees. If resources were tight, trainees could be role-play actors for some or all of the stations.

Conclusion

We run a local mock exam annually due to continued demand from trainees. It takes significant time and effort to arrange but is good experience for the organiser and local trainees and consultants remain enthusiastic. The mock CASC in the West of Scotland puts a strong emphasis on providing feedback for trainees to work on. The provision of completed marking sheets on the day of the exam and the group feedback session help with this ethos. Our experience has shown that a mock CASC can be delivered locally, at a low cost, while still providing trainees with a realistic exam experience.

Competing Interests

Dr Heather Welsh is the Higher Trainee Chair of the West of Scotland MRCPsych course organisers' committee. Author Details HEATHER WELSH, MBChB PGCert MRCPsych, ST5

Learning Disability Psychiatry Trainee, Ferguson Smith Building, West Glasgow Ambulatory Care Hospital (formerly Yorkhill Hospital), Dalnair St, Glasgow, G3 8SJ CORRESPONDENCE: HEATHER WELSH, Ferguson Smith Building, West Glasgow Ambulatory Care Hospital (formerly Yorkhill Hospital), Dalnair St, Glasgow, G3 8SJ Email: heather.welsh@nhs.net

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SPA days for all trainees?

Alexander Hall and Joanna Spence

Abstract

Trainees applying to specialty training are being expected to demonstrate multiple skills acquired alongside their clinical practice such as audit, research and management. These skills are expected to help develop a trainee in readiness for consultant jobs; yet with increasing clinical expectations finding the time for this can be difficult. Could a re-structuring of trainee's study leave to allow "Supporting Professional Activities" (SPA) time help facilitate the development of these skills?

Keywords: Training, SPA, Anaesthesia

The Issues

Supporting Professional Activities (SPA) time is a part of each consultant's new contract. When the new consultant contract evolved in 2003, a suggested breakdown of the week was 7.5 sessions (1 session equates to 4 hours) for direct clinical care (DCC) and 2.5 sessions for SPAs.1 This was driven by the need for consultants to continue their own professional development (CPD) as well as having the time for input into the development of trainees and medical students.

Examples of CPD work for consultants could include audit for improvement of service or patient care, teaching of patients, medical students or trainees, research, publications, aspects of hospital management and involvement in simulation courses e.g. Advanced Life Support (ALS)/Advanced Paediatric Life Support (APLS).

The General Medical Council (GMC) requires that during annual appraisals, doctors should use supporting information to demonstrate they continue to follow "Good Medical Practice". This mandates that doctors should 'take part in educational activities that maintain and further develop' their competence and performance.1 With regard to revalidation, the GMC states you will have to demonstrate that you regularly participate in these activities; at Annual Review of Competency Progression (ARCP) it is imperative that accurate records of these CPD activities are presented at the annual job plan review.2

It is clear, therefore, that the provision of allocated time during the working week to complete these aspects of work life are deemed necessary for consultants. The Royal College of Anaesthetists and Association of Anaesthetists of Great Britain and Ireland both support the original view that a consultant should "typically" have 2.5 SPAs in their contract (though this would have to be subject to individual workload). With the demands of service provision it is clear that consultant SPAs are under threat, with around 40% of new consultants offered jobs with fewer SPA sessions than are thought necessary to allow sufficient non-DCC work.3

Since trainees are subject to similar appraisal and development requirements, we wonder if trainees should be allocated SPA time? For progression through training years and to pass the ARCP, it is necessary to provide evidence of trainee development within clinical practice in a similar way to consultants. This can involve a great deal of extra time. Once (notoriously difficult) exams have been passed, each trainee must go through the application process and prove what skills they have assimilated during their training to date. In fact, the ST3 anaesthesia application criterion states that the following are some of the 'desirable' criteria that require evidence:

- Relevant academic and research achievements
- Involvement in an audit project, or quality improvement project
- Interest and commitment to the specialty beyond the mandatory curriculum
- Evidence of interest in, and experience of, teaching
- Instructor status in an advanced life support course (ALS, APLS)
- Involvement in management...and understanding of management
- Effective multi-disciplinary team working and leadership
- Effective leadership in and outside medicine
- Achievement outside medicine
- Altruistic behaviour, e.g. voluntary work

The list is extensive and clearly requires a lot of time and input outside of the normal working week. With the expectation that trainees should be prepared to move straight from CT2 to ST3 (assuming their exams are completed), these desirable criteria must be addressed alongside completing other mandatory aspects of training such as, for anaesthesia: an Initial Assessment of Competency (IAC), an Intensive Care Unit (ICU) module, an Initial Assessment of Obstetric Competency (IAOC) and 15 Units of Training. With all these challenges between a core anaesthetic trainee and potential specialist anaesthetic training, there seems little time to complete an adequate number of the desirable criteria; this is a compelling reason to facilitate some time into the trainee contract to help produce more wellrounded trainees.

However, therein lies the challenge - anaesthetic training is such a busy programme. Trainees are involved with multiple areas within a hospital such as ICU, theatre work or Obstetric Delivery Suite that they must learn and practice a wide range of skills to demonstrate the proficiency expected of a consultant anaesthetist. With experience of clinical work already at a premium due to European Working Time Directive hours, creating a good teaching environment whilst providing service provision is a hard enough task. It might seem difficult, therefore, to justify taking away yet more clinical time for trainees.

The proposed "7 day National Health Service (NHS)" contract could also pose more difficulties. Current example rotas released by NHS Employers demonstrate an increased likelihood of shift-work for a typical ICU rota.4 This shows trainees will be working more weekends and nights than at present, which could reduce the time spent directly with consultants. This would make introducing more non-DCC work difficult to justify as it would likely occur during daylight hours – when training could occur.

How it could be introduced:

Assuming SPA sessions for trainees were implemented, there would also be practical aspects to address. For example, how many SPA sessions to allocate for each level of trainee and how to monitor that this time was spent effectively and efficiently.

Monitoring:

Trainees could propose which aspects to focus on during their SPA sessions, such as management, teaching, quality improvement projects or more time in their sub-specialty interest. The goals could then be set at the initial educational supervisor meeting, much like a Personal Development Plan (PDP), and monitored throughout the year. This would give focus to any SPA time and ensure it is effectively used. If a trainee abuses their time or is not using it appropriately then removal of SPA time could be enforced. This would give the trainees more ability to improve the skills so often considered additional to trainees.

Funding:

In times of NHS austerity, funding would also need addressing. Potentially neither Deanery nor Trust might be willing to pay a doctor for days spent working outside the hospital workload – such as in educational roles or as a college tutor.5 A trial in one single deanery could assess the efficacy of such a scheme.

A possible solution would be to remove a few days of study leave allowance, as many trainees do not use their whole entitlement, and re-assign these to SPA time, allowing a trainee more flexibility. Trainees could initially start with fewer SPA sessions when more junior, to allow more clinical time, increasing SPAs to one per week for intermediate or higher trainees who may well be approaching their Certificate of Completion of Training (CCT).

Conclusion:

There are some practical difficulties in establishing trainee SPA sessions and no doubt many feel all contracted time should be spent practicing anaesthesia. However, given the changing way trainees are recruited via a 'tick-box' national application system, together with the variety of non-clinical skills expected by consultancy such as an ability to teach, conduct audit work, engage in managerial roles etc., a small change in the training set-up could produce more rounded trainees, benefitting anaesthesia in general and training programmes in the future.

Competing Interests None declared Author Details ALEXANDER HALL, MBBS BSc, Simulation & Education Fellow, Worthing Hospital, BN11 2DH, UK; JOANNA SPENCE, MBBS, Brighton and Sussex NHS Trust, BN2 5BE, UK. CORRESPONDENCE: Dr Alexander Hall, Simulation and Education Fellow, Anaesthetic Department Worthing Hospital, Lyndhurst Road, Worthing BN11 2DH. Email: alexander.hall@nhs.net

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Improving Communication Skills Using Simulation Training

Priya Subramanian and Krishanthi Sathanandan

Abstract

Introduction Medical trainees are required to manage complex communication scenarios effectively on entering specialty training. Whilst significant emphasis is placed on undergraduate basic communication skills training, there is little formal postgraduate training. Communicating effectively with patients and families plays a vital role in providing high quality care, and a significant proportion (10.5% in 2012/2013) of medical complaints pertain to poor communication.⁽¹⁾ We conducted a survey of junior medical trainees. This showed only 50% felt somewhat competent in engaging in difficult communication scenarios, while 88% experienced significant challenges. All expressed interest in further training.

Methods Simulation-based training is known to provide a controlled environment in which it is safe to learn from errors ⁽²⁾, and improves learner outcomes. ⁽³⁾ We created a course using simulation to develop medical trainees' competencies in advanced communication skills.

Two sessions were conducted. Professional actors and role-play exercises were used, with interactive feedback from a senior doctor in elderly/palliative care medicine. Scenarios concentrated on end of life discussions and capacity assessment.

Results Feedback was obtained from participants using a Likert scale of 1 - 5. 100% felt the content was useful, and their skills and confidence had increased. All trainees and facilitators felt this would be beneficial for others.

Discussion The European Working Time Directive has led to difficulty gaining proficiency in key skill areas due to reduced patient encounters. Simulation training is now routinely used to tutor trainees. This pilot programme shows the value of using this modality to teach higher-level communication skills.

Introduction

Communicating effectively with patients and families is a vital component of high quality care. Studies have shown that patients feel excellent communication in consultations is vital for instilling confidence in the medical practitioner.^{1,2} There is evidence that doctors are not meeting this fundamental need.³

Some consider it an ethical obligation of doctors to balance their training needs against providing optimal care for patients. It is well known that junior trainees have significant level of performance anxiety that translates through to their consultations.⁴

Simulation based training is now an integral part of postgraduate curriculum in training a variety of medical specialties in managing acute scenarios. As an education method it provides a controlled environment in which it is safe to learn from errors,⁵ and improves learner outcomes.⁶ Simulation has been shown to be a valid approximation of true clinical practice.⁷ It therefore allows trainees to reach higher levels of proficiency prior to embarking on real patient encounters.

Current Core Medical Trainees (i.e. junior doctors who have embarked on the first stage of physician training within England) in the London deanery are expected to be able to manage complex communication scenarios effectively prior to entering specialty training. This is demonstrated by requirements set out in the Core Medical Curriculum, as detailed in Box 1. Whilst significant emphasis is placed on communication skills training in basic scenarios at a medical student level, there is very little formal postgraduate communication skills training within this deanery and others.

Box 1: Excerpts from Core Medical Trainee curriculum

- Counsel patients, family, carers and advocates tactfully and effectively when making decisions about resuscitation status, and withholding or withdrawing treatment
- Able to explain complex treatments meaningfully in layman's terms and thereby to obtain appropriate consent even when there are problems of communication and capacity
- Skillfully delivers bad news in any circumstance including adverse events

This deficit in training led us to conduct a survey exploring Core Trainees' views regarding communication skills training in the London deanery. Findings from the survey are detailed in Box 2.

Box 2: Results from Core Trainee Survey

• 83% received less than 2 hours of post-graduate training in communication skills since the start of Core Medical Training

- Only 50% felt somewhat competent in engaging in difficult communication scenarios
- 88% reported significant challenges when conducting these discussions. They have had difficult on-calls experiences relating to communication difficulties
- 100% displayed interest in attending further Simulation Training in advanced communication skills

Method

We devised a pilot project using simulation to develop trainees' competencies in advanced communication skills. After application to our local training board, we secured funding to run a number of sessions for core medical trainees within the London area.

The objectives of our pilot project were to provide experience of realistic communication based scenarios in a structured and safe environment to core trainees; provide feedback on trainees' communication styles and offer suggestions for improvement; improve confidence of trainees in difficult communication situations.

Each session was conducted in an afternoon session and candidates were divided into three groups of three trainees who would remain together for the entire session. We ran four sessions, with a total of 36 trainees. Each group was facilitated by a consultant or a higher trainee in either elderly or palliative care medicine, given our focus on resuscitation/end of life discussions and assessment of capacity. We employed three actors to rotate around each group performing a variety of roles including patients and relatives. With a total of six scenarios, each trainee had the opportunity to participate in at least two scenarios lasting approximately 15 minutes, with feedback thereafter for approximately 10 minutes.

The scenarios employed were based on personal experience of regularly occurring, challenging communication situations encountered in our own clinical practice. We created detailed scripts for the actors as well as corresponding clinical vignettes for the candidates.

The scenarios were:

- End-of-life discussion with a challenging family regarding a patient with end-stage dementia.
- Discussing resuscitation with a family opposed to do not attempt resuscitation (DNAR) regarding an acutely unwell patient with poor functional baseline.
- Discussing resuscitation with a young patient with metastatic cancer undergoing palliative chemotherapy who has little understanding of the terminal nature of the disease.
- Assessing mental capacity regarding discharge planning in a patient with mild to moderate dementia.

- Assessing mental capacity regarding treatment in a patient with moderate learning difficulties.
- Assessing mental capacity in a medically unwell patient with mental health issues who wishes to self discharge from the ward.

Box 3 outlines the session structure.

Box 3:	Timetable	e for	the	session

12.30-12.45:	Actors briefing
12.45- 13.00:	Facilitators briefing
13.00-13.30:	Core trainee briefing
13.30-14.45:	Scenarios 1-3 in small groups
14.45-15.00:	Tea/Coffee break
15.00-16.15:	Scenarios 4-6 in small groups
16.15-16.45:	Feedback and closing

Results

Written feedback was obtained from all participants by distributing a post-course evaluation form, with a 100% response rate. A number of areas were assessed via a Likert scale of 1 - 5, with 1 being 'not at all' and 5 being 'very much'. 100% of trainees felt the content was useful and their knowledge/skills had increased. 100% felt more confident after the session and all trainees and facilitators felt this would be beneficial for medical trainees. A full breakdown of results is detailed in Table 1.

Table 1: Results from	post-course fee	dback
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Was it interesting & informative ?	Not at all	1	2	3	30/36 83%	6/36 17%	Very interesting
How Useful was the content?	Not at all	1	2	3	26/36 72%	10/36 28%	Very useful
Have your knowledge/ skills increased?	Not at all	1	2	3	17/36 47%	19/36 53%	Very Much
Do you feel more confident?	Not at all	1	2	3	17/36 47%	19/36 53%	Very Much
How well was it delivered?	Not at all	1	2	3	30/36 83%	6/36 17%	Very well

The post-course feedback form allowed for free text feedback from participants, with some individual examples given below:

"Realistic scenarios - good opportunity to experience them and get feedback in a safe environment, good practice of common communication problems"

"It builds confidence in dealing with these situations and provides basis for building up "

"This work dealt with complicated cases and actors were not too easy which I liked. Good and unforgettable"

Discussion

With the European Working Timing Directive and resulting shorter working hours, gaining proficiency in a number of key skill areas is limited due to reduced patient encounters. A recurrent complaint among core medical trainees is the lack of observed clinical encounters that leads to individualised feedback.

Feedback from more experienced speciality practitioners was only one component of our attendees learning experience. They also benefited from personal practise in a non-threatening environment, observation of their colleagues communication styles and finally learning through reflection with their colleagues

This innovation has shown a clear benefit in amplifying the confidence and preparedness of our core medical trainees in approaching these higher level communication scenarios. Future directions include introducing quantitative assessments pre- and post- course to objectively demonstrate improved confidence and performance. Providing the course to trainees in other specialties as well as across the multidisciplinary team would also be beneficial given the universal requirement of healthcare professionals to communicate skilfully.

Competing Interests

None declared

Author Details

PRIYA SUBRAMANIAN, MBBS BSC, University College London Hospital, 235 Euston Rd, London, NW1 2BU, England. KRISHANTHI SATHANANDAN MBBS BSC, University College London Hospital, 235 Euston Rd, London, NW1 2BU, England. CORRESPONDENCE: PRIYA SUBRAMANIAN, MBBS BSC, University College London Hospital, 235 Euston Rd, London, NW1 2BU, England. Email: psubramanian@doctors.org.uk

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Clive Sherlock & Chris John

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Abstract

Aims Doctors suffer from stress, anxiety and depression more than the general population. They tell patients to seek help but are reluctant to themselves. Help for them is at best inadequate. This is a preliminary study to see if a radically different approach could change this. We offered a six-month training course of Adaptation Practice (The Practice), a behavioural programme of self-discipline designed to deal with stress, anxiety and depression, to see if it would be acceptable and effective for a group of General Practitioners (GPs).

Methods All GPs in one UK Health Area were asked if they would be interested in a course to cope with stress, anxiety and depression. Respondents completed the Hospital Anxiety and Depression Scale (HADS) and those with scores \geq 8 were invited to the course. Scores for those who attended were compared with scores for a control group. The study group wrote anonymous self-assessments.

Results Of 314 registered GPs, 225 responded. 152 were openly interested in the course. Of these, 71 had HADS scores \geq 8 for anxiety, 35 for depression and 79 for both; 29 applied to attend the course. Due to prior commitments 14 could not attend and 15 did attend.

All 15 found Adaptation Practice acceptable. Their HADS scores improved significantly compared with those of the control group and their self-assessments were positive.

Conclusions Doctors tend to be secretive about their own difficulties coping with emotional and psychological problems and are reluctant to admit a need for personal help. However, 68% of respondents were willing to express an open interest in learning how to cope. This in itself was a breakthrough. We suggest that this was because the course was offered as postgraduate training with no suggestion of illness, treatment or stigma. All those learning Adaptation Practice found it acceptable and recognised significant positive changes in themselves, which were supported by significant positive changes in the HADS scores and the authors' clinical assessments.

Keywords: doctors, general practitioner, GP, stigma, treatment, disclosure, cope, stress, anxiety, depression, mental illness, adaptation practice, education

Abbreviations: GP – General medical practitioner, HADS – Hospital Anxiety and Depression Scale, SSS – Simple Stress Scale, LSD – Fisher's Least Significant Difference, SPSS – Statistical Package for the Social Sciences, AP – Adaptation Practice

INTRODUCTION

Like doctors in other specialties, general medical practitioners (GPs) are exposed daily to human suffering which most of society try to avoid.¹ The World Health Organisation (WHO) predicts that by 2030 depression will be 'the leading cause of disease burden globally.' And that 1 in 4 individuals seeking health care are 'troubled by mental or behavioural disorders, not often correctly diagnosed and/or treated.^{2, 3} Doctors suffer from stress, anxiety and depression (as well as vascular disease, cirrhosis of the liver and road traffic accidents) more than the general population.⁴⁻¹⁰ Help for doctors is inadequate and doctors are reluctant to seek help.^{1, 4, 11} Where improvement is suggested, it is usually as counselling and general support.¹¹ Instead of 'more of the same', we suggest a radically different approach: Adaptation Practice, which Clive Sherlock pioneered and has taught since 1975. It is pragmatic and safe. This study tests its acceptability to a group of working doctors.

Doctors bear the responsibility for fellow human beings' health, well-being and, often, for their very survival. Added to this, GPs

are under increasing pressure from more patients who want more cures and from health service managers who demand clinical excellence and more administration and more managerial skills of them. GPs' stress is related to increasing workloads, changes to meet requirements of external bodies, insufficient time to do the job justice, paperwork, long hours, dealing with problem patients, budget restraints, eroding of clinical autonomy, and interpersonal problems.^{6, 10, 12}The recent rise in the GMC's Fitness to Practice complaints related to patients' expectations of doctors is yet another stress making them feel threatened.¹³

Job satisfaction for GPs is at its lowest level since a major survey started ten years ago, while levels of stress are at their highest. In 2015 there had been a year on year increase in the number of GPs reporting a slight to strong likelihood of their leaving 'direct patient care' within five years, with 53% of those under 50 and 87% of those over 50.⁶

By nature and vocation, GPs want to help but too much pressure is unbearable and takes its toll. They work, not with numbers, data or profits, but with human suffering, which, inevitably, is an emotional burden because of compassion and because it makes them aware of their own vulnerabilities and mortality. ^{3, 14} When combined with heavy workloads and low morale, doctors themselves inevitably suffer emotionally and psychologically.^{7, 10, 14} At the same time they and others feel they should be invincible.^{1, 15-17} What professional help is available for them is inadequate.^{3, 4, 18, 19} Existing support services in the UK are underfunded and sporadic.⁴ Some are outsourced to counselling services, and some of these are by telephone. Doctors do not like to be counselled and are reluctant to use these services.^{4, 15, 17}

Doctors themselves are the mainstay for diagnosis and treatment of mental illnesses but are not adequately trained.^{3, 20}Mental illness is not well understood and conventional treatments are insufficient and often harmful.^{15, 20-23}Consequently, doctors do not have the wherewithal to deal with the emotional and psychological problems they face every day in their patients and often in themselves, their colleagues and their families.^{4, 12, 18}

There is significant prejudice, stigmatisation and intolerance of mental ill health within the medical profession due to lack of understanding and fear.^{3, 4, 9, 15, 17, 20, 21, 22, 24} This not only affects how doctors treat their patients, it also exacerbates their own difficulties when they suffer with emotional and psychological problems themselves, and dissuades them from self-disclosure and from seeking professional help.^{3, 4, 8, 10, 18, 20, 25, 26} To succumb to stress, anxiety and depression is seen as being weak and inadequate as a person and in particular as a doctor.^{3, 4, 15} Doctors think they should know the answers and should be able to cope.^{1, 4}

However, doctors are willing to learn work-related skills as this present study set out to show.¹¹ Adaptation Practice is training; not treatment or therapy. The course in this study was presented as a postgraduate programme for doctors to learn how to cope with stress, anxiety and depression.

METHOD

Recruitment

We asked by letter all 314 GPs registered in one UK urban and semi-rural Health Authority Area if they would be interested in a course of twelve fortnightly seminars to learn the basics of Adaptation Practice: a programme of self-discipline to cope with stress, anxiety and depression. Included, was the Hospital Anxiety and Depression Scale (HADS). Those who responded and whose HADS scores were ≥ 8 (the threshold for anxiety and depression) were invited to the course.

Stress, anxiety and depression

Anxiety and depression were assessed by the HADS and stress by a simple stress scale (SSS – see Table 1) one month before training started, immediately prior to training, at three months (mid-way through the training) and at six months (at the end of training).

Table 1: The Simple Stress Scaledeveloped by Clive Sherlock and used to assess the level of stress in a subject. A total score ≥ 8 , out of a maximum of 24 is suggestive of a disturbing level of stress or burnout. I feel I am under too much stress: 0 hardly ever 1 occasionally 2 most of the time 3 all the time I feel exhausted: 0 seldom 1 some of the time 2 much of the time 3 most of the time I care about other people: 0 as much as I ever did 1 rather less than I used to 2 definitely less than I used to 3 hardly at all I have lost my appetite: 0 not at all 1 a little 2 moderately 3 significantly I sleep well: 0 most of the time 1 quite often 2 occasionally 3 not at all I am irritable: 0 not at all 1 occasionally 2 quite often 3 very often indeed I feel dissatisfied: 0 never 1 occasionally 2 quite often 3 most of the time I feel run down: 0 not at all 1 occasionally 2 quite often 3 most of the time

Evaluation of Adaptation Practice

Half of those GPs who applied for the course were unable to attend because of prior commitments on the days planned for the course. These acted as a control group. Those who attended the course were the study group. All those who attended were also assessed in private by the authors immediately before and throughout the course. At the end of the course the doctors wrote anonymous self-assessments.

Training in Adaptation Practice

Those attending the course were taught not to express and suppress upsetting and disturbing emotion, not to distract their attention from it (including not to think about it and not to analyse it) and not to numb themselves to it with chemicals (alcohol, recreational drugs or prescribed medication). Instead, they learned how to engage with their moods and feelings physically, not cognitively, and how not to engage with thoughts about them. They were instructed to practise this six days a week with whatever they were doing, wherever they were. They were all offered unrestricted confidential telephone and email support from the authors between training sessions and after the course had finished.

Statistical Analyses

The results are reported as means \pm standard errors of the means. The scores were normally distributed and the data were analysed by analysis of variance with additional paired comparisons within periods, using the LSD method. Correlations were determined using Pearson's correlation. The analyses were carried out using the statistical software programme SPSS 17.0 for Windows.

RESULTS

Recruitment

Of 314 registered GPs, 225 (72%) responded to our initial contact, and of these 152 (68%) said they would be interested in participating in the training course. Recruitment was restricted to those with HADS scores ≥ 8 . Of the 225 who responded there were 71 (32%) for anxiety, 35 (16%) for depression, and 79 (35%) for both. 29 (13%) applied to attend the course. All were experienced GPs. 15 of these attended and 14 were not able to attend because of pre-existing commitments on the course dates. They asked for alternative dates but these were not available.

At the initial assessment (one month before the course started) there were significant correlations between the scores for anxiety and depression (P < 0.001), anxiety and stress (P < 0.001) and depression and stress (P < 0.001). At the second assessment immediately before the course started these correlations remained highly significant.

Effects of Adaptation Practice

All those who attended the course reported a subjective improvement in their abilities to cope with their own stress, anxiety and depression, and in their sense of well-being.

<u>Anxiety</u>

There were no significant differences between the control and study groups either one month before the start (P=0.949) or immediately before the first session (P=0.914). The anxiety scores in both groups remained greater than 8 at both assessments (Figure 1). At the mid-point of the course the mean score had fallen slightly in the study group (Figure 1) but the difference was not significant (P=0.652) By the end of the course the mean anxiety score in the study group was significantly lower (P=0.008) than that of the control group (Figure 1). The mean scores for anxiety decreased over the 4 assessments. This tendency was significant in the study group (P=0.002) but not in the control group (P=0.567).



Figure 1: The mean anxiety scores and standard errors of the means (SEM) for a control group and a study group of doctors with pre-existing signs of anxiety, assessed twice before, once during and once at the end of a six-month course in Adaptation Practice.

<u>Depression</u>

There were no significant differences between the control and the study groups either one month before the start (P=0.310) or immediately before the first session (P=0.880). The mean HADS scores for depression before training were all greater than 8 (Figure 2). At three months (the mid-point of the course) the difference between the mean scores in the two groups was not significant (P=0.631). At the end of the course the mean depression score in the study group was significantly lower (P=0.046) than the control group (Figure 2). The mean scores for depression decreased over the 4 assessments. This tendency was significant in the assessment group (P=0.003) but not in control group (P=0.689).



Figure 2: The mean depression scores and standard errors of the

means (SEM) for a control group and a study group of doctors with pre-existing signs of depression, assessed twice before, once during and once at the end of a six-month course in Adaptation Practice.

<u>Stress</u>

There were no significant differences between the control group and the study group either one month before the course started (P=0.234) or immediately before it started (P=0.505). The stress scores were all greater than 8 (Figure 3). At three months (the mid-point of the course) the difference between the mean scores between the two groups was not significant (P=0.621). At the end of the course the mean stress score in the study group was lower (P=0.077) than that of the control group (Figure 3). The mean assessment scores for stress decreased over the 4 assessments. This decrease was significant for the assessment group (P=0.001) but not for the control group (P=0.425).

Stress scores



Figure 3: The mean stress scores and standard errors of the means (SEM) for a control group and a study group of doctors with pre-existing signs of stress, assessed twice before, once during and once at the end of a six-month course in Adaptation Practice.

<u>Correlations</u>

At all four assessments there were correlations among all three psychological parameters. At the initial assessment the correlation between anxiety and depression (r2=0.405; P = 0.029) and between depression and stress (r2=0.800; P < 0.0001) were significant but the correlation between anxiety and stress was not (r2=0.253; P = 0.185). At the commencement of the course the correlation between anxiety and depression (r2=0.479; P = 0.009), between depression and stress (r2=0.765; P < 0.0001) and between anxiety and stress (r2=0.476; P < 0.0001) and between anxiety and stress (r2=0.486; P = 0.007) were all significant.

At three months (the mid-point) the correlation between anxiety and depression (r2= 0.526; P = 0.003), between depression and stress (r2= 0.622; P < 0.0001) and between anxiety and stress (r2= 0.790; P < 0.0001) were all significant and similarly at the and of the course: the correlation between anxiety and depression (r2= 0.604; P = 0.001), between depression and stress (r2= 0.577; P = 0.001) and between anxiety and stress (r2= 0.740; P < 0.0001) were also all significant.

Assessments of the doctors' psychological states and methods of coping

The doctors attending the course were assessed individually in private. They variously complained of stress, anxiety and depression. Notable findings included suicidal thoughts, plans for suicide, self-medication, excessive consumption of alcohol and an intention to leave the medical profession because of the unbearable pressures involved.

By the end of the course all these signs and symptoms had improved and the doctors felt confident in their ability to cope not only with pressures from outside but also with emotion, moods and feelings inside. One doctor still wanted to leave the profession but less adamantly than before, and stayed.

There was no qualitative assessment of the control group.

Qualitative Self-assessments

The anonymous self-assessment reports give meaningful, subjective accounts of what the doctors experienced individually. They fall into four main themes. There were no negative comments.

Connecting with emotion physically in the body

The following comments indicate contact with emotion:

- 'I am more aware of my feelings.'
- 'It is difficult to say "Yes" to unpleasant or upsetting feelings and situations. I have always preferred to avoid them and I have had a lifetime of suppressing emotions, so it is very difficult to say "Yes" to them, but this is what I am now doing.'
- 'Since I've been more aware of my feelings there has been an enormous improvement in concentration.'

Developing inner emotional strength and coping.

A number of comments indicate the need to develop the strength to contain emotion physically in the body:

- 'I am more accepting of daily stresses at work.'
- 'I try to deal with problems instead of feeling so desperate and so wronged by them.'
- 'I am calmer, and I lose my temper less often and less dramatically.'
- 'The Practice was difficult initially because of my own resistances to it.'
- 'I've always avoided seeking help for myself. I often feel worse than the patients I prescribe antidepressants for. I can now cope and I feel stronger but I don't feel I've been

treated and I now realise I didn't need treatment: I needed to learn what to do and how to *do it.*'

Dealing with unpleasant, unwanted thoughts.

These comments illustrate the doctors' new reactions to thoughts as they started to address the underlying emotion that normally drives worrying thoughts:

- 'I now have less ruminations.'
- 'As a long-standing ruminator I now realise these thoughts are the source of many anxieties. Thoughts were the main problem for me.'
- 'I have learned to deal with obsessional thoughts by not giving time to them.'

<u>General well-being.</u>

The doctors commented on their sense of general well-being and ability to cope:

- 'I am less tense and less anxious.'
- 'I am now coping with episodes of work overload much better.'
- 'I am feeling better generally.'
- 'This has given me confidence to pursue the course of action I knew was correct.'
- 'There are all-round improvements because of adapting myself to work and other people.'
- 'I am happier and more content, optimistic and much less negative.'

DISCUSSION

Varying degrees of stress, anxiety or depression are universal.^{16, 26} Only about half of those thought to be clinically affected by these conditions seek help for them.²⁶ If put into practice, sound medical knowledge and training can be beneficial to doctors' own health.^{1, 11, 15} This does not seem to be true for stress, anxiety and depression.²² Too little is known about emotional and psychological problems, and treatment for them is inadequate.^{2, 9, 15, 17, 19, 21, 23, 28, 29}

In this study, there was a high level of interest in how to deal with stress, anxiety and depression. Almost one third of respondents had scores on the HADS and SSS that suggested worrying levels of emotional and psychological problems amongst these working GPs. The fact that 152 doctors (68% of respondents) declared an interest in a six-month evening course (90 minute sessions after work on Thursday evenings) to learn how to deal with these conditions, suggests that:

• stress, anxiety and depression are significant problems either amongst their patients or for the GPs themselves, or both

- GPs are not confident in their ability to deal with them and want to learn more
- although they have a strong tendency not to admit that they cannot cope and not to seek help, doctors are willing to attend a course to train and to learn.¹¹

Most doctors tell their patients to seek professional help and to talk about their feelings but do not do so themselves.^{3, 5}They prescribe drugs for their patients that either the doctors will not take themselves or that they take but find ineffective. Of the 15 GPs on the course only one had mentioned psychological difficulties to a colleague and one to a partner and both only reticently.¹⁶

ADAPTATION PRACTICE

Adaptation Practice strongly discourages self-disclosure, except in private to the Adaptation Practice teacher, which is necessary in order to assess the nature and severity of any problems and to lay the foundations for a rapport. Adaptation Practice sessions involve detailed discussion of moods and feelings as physical sensations and powerful forces that affect behaviour in all human beings. The ethos in Adaptation Practice is for participants to learn from their own experience how they are affected by emotion and how they can change this by containing themselves and not letting the emotion control them. It is not to criticise, judge, blame or condemn. Consequently, without the causes of stigmatisation, there is no prejudice and no stigma; instead there is respect and dignity and a pragmatic attitude to change.¹⁶

Adaptation Practice trains individuals to bear and endure upsetting, disturbing emotion by not expressing it, not suppressing it, not distracting themselves from it and not numbing themselves to it with drugs (alcohol, recreational drugs or prescribed medication). Bearing it this way develops emotional strength and resilience.

The high level of interest, the willingness to attend in groups and the positive results from this study indicate that Adaptation Practice is an acceptable way of teaching doctors how to cope with their own stress, anxiety and depression, that makes sense intellectually and emotionally. This, as well as the pragmatic approach mentioned above, makes Adaptation Practice radically different from other approaches.

GENERAL COMMENTS

Given that those who could not attend asked for an alternative day to attend, gave us reason to assume that the manner in which the study group and the control group were selected – individual availability on a given week night – would not have biased the sampling procedures and it seems reasonable to assume that the two groups did not differ in any meaningful way that would have biased the outcome. Not surprisingly, there were strong positive correlations between anxiety and depression and between depression and stress on all assessments and between anxiety and stress on all but the first assessment, suggesting a strong association among these parameters of psychological states.

The mean scores for anxiety, depression and stress fell significantly in the participating GPs compared with the control group. The subjective reports from both the medical assessments and the self-assessments support these changes in the study group.

This study begs a number of important questions:

- if doctors are prejudiced and stigmatise mental illness amongst themselves then what are their conscious, or unconscious, attitudes to mental illness in their patients? ^{3,} 5, 9, 24
- if doctors cannot cope with emotional problems themselves then whom are they and their patients to turn to for help? This is not the same as doctors suffering from physical conditions requiring surgery, or medications such as insulin or antibiotics.^{3, 5} Doctors expect, and are expected, to be able to cope with their emotions and, if necessary, that the treatment they give their patients will also work effectively for themselves
- what are doctors to do and what are their patients to do, when doctors succumb to their own moods and feelings?

Adaptation Practice could be integrated in the medical curriculum at undergraduate and postgraduate levels, including Continuing Professional Development (CPD). Not only GPs but all doctors and other healthcare staff (nurses, physiotherapists, occupational therapists, social workers, etc.) could develop emotional resilience – which the GMC have proposed in recent years – and a better understanding of emotional and psychological problems and mental illnesses.

It is hoped that this preliminary study will stimulate and encourage a new way of looking at and investigating emotional and psychological problems and lead to further evaluation of Adaptation Practice.^{29, 30}

With adequate training doctors and psychologists could teach Adaptation Practice.

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Competing Interests

Clive Sherlock has taught Adaptation Practice since 1975 Author Details

CLIVE SHERLOCK, BM BS, MRCPSYCH, Wolfson College, Oxford OX2 6UD, UK.

CHRIS JOHN, MB BS, MRCGP (Retired), Newport, Gwent, UK.

CORRESPONDENCE: CLIVE SHERLOCK, Wolfson College, Oxford OX2 6UD, UK.

Email: clivesherlock@adaptationpractice.org

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