

FACULTY OF PAIN MEDICINE
AUSTRALIAN AND NEW ZEALAND COLLEGE OF ANAESTHETISTS
ABN 82 055 042 852

**EXAMINATION HELD ON 29th, 30th NOVEMBER
AND 1st DECEMBER 2006**
AT THE SIR CHARLES GARDINER HOSPITAL, PERTH.

THIS REPORT IS PREPARED TO PROVIDE CANDIDATES AND SUPERVISORS OF TRAINING WITH INFORMATION ABOUT THIS EXAMINATION AND TO ASSIST WITH PREPARATION FOR FUTURE EXAMINATIONS. ANSWERS PROVIDED ARE NOT MODEL ANSWERS BUT GUIDES TO WHAT MIGHT BE COVERED. SOME ANSWERS CONTAIN MORE INFORMATION THAN COULD BE COVERED IN THE FIFTEEN MINUTES, BUT HAVE BEEN INCLUDED AS A TEACHING AID. THE ANSWERS PROVIDED ARE CONSIDERED CURRENT, BUT MAY BE SUBJECT TO CHANGE IN THE FUTURE.

CANDIDATES SHOULD DISCUSS THE REPORT WITH THEIR TUTORS SO THAT THEY MAY PREPARE APPROPRIATELY FOR FUTURE EXAMINATIONS.

The Examination is an integral part of the Pain Medicine Training Program, leading to the award of Fellowship of the Faculty of Pain Medicine.

The Objectives of Training guide the range of content, which may be assessed.

The Examination consists of written and oral sections and covers the theory and practice of Pain Medicine.

In 2006 twenty candidates presented for the examination and fourteen were successful.

EXAMINATION PASS RATE 70%

WRITTEN SECTION (See Appendix A for guides to question answers)

The following are the questions. The first five questions were compulsory.

WRITTEN PASS RATE 65%

1.

Write short notes on the pharmacology and side effects of local anaesthetic agents.

Attempted by 20 candidates

PASS RATE 95 %

2.

You are asked to give an expert opinion to the Medical Board in relation to the appropriate management of a patient (who is a Registered Nurse), with chronic backache. She is being prescribed sustained release morphine (300mg three times per day). The patient also receives frequent injections for breakthrough pain.

Outline the points that you would consider in formulating your reply.

Attempted by 20 candidates

PASS RATE 45%

3.

Critically discuss current views on the possible importance of personality and personality disorders in chronic pain and their implications for treatment outcome.

Attempted by 20 candidates

PASS RATE 60%

4.
What are the principles underlying the prescription of breakthrough analgesia in different clinical settings?

Attempted by 20 candidates

PASS RATE 35%

5.
Briefly discuss the differential diagnosis and investigation of a 50-year-old man presenting with a 6-week history of right arm pain, starting in the shoulder and radiating down the posterior arm to the elbow.

Attempted by 20 candidates

PASS RATE 65%

6.
Discuss modern concepts of chronic visceral pain.

Attempted by 15 candidates

PASS RATE 13%

7.
Write notes on the genetic influences on pain and response to therapies.

Attempted by 9 candidates

PASS RATE 67 %

8.
As a consultant in Pain Medicine, you have accepted an invitation to give a Post-Graduate lecture on the role of antidepressants in the management of chronic pain.

Discuss the points that you will present to your audience.

Attempted by 18 candidates

PASS RATE 78%

9.
A 65 year old woman is referred with a 6 month history of painful burning sensations in her feet. A provisional diagnosis of erythromelalgia has been given.

Discuss the differential diagnosis and investigations that would determine your management program.

Attempted by 4 candidates

PASS RATE 25%

10.
Discuss the pathogenesis and management of rebound headache.

Attempted by 10 candidates

PASS RATE 90%

11.
Discuss the role of Activity Management (Pacing) as it applies to the management of patients with prolonged pain.

Attempted by 7 candidates

PASS RATE 57%

12.
Discuss the evidence base for the addition of adjuvant medication to intrathecal opioid infusions.

Attempted by 4 candidates

PASS RATE 25%

13.

A 35 year old man taking buprenorphine 16 mg per day presents to the emergency department following a motorbike accident in which he sustained a compound fracture of his tibia and fibula and a pelvic fracture.

Outline your approach to pain management in this patient and comment on any factors that might affect your ability to provide effective and safe pain relief.

Attempted by 17 candidates

PASS RATE 94 %

14.

Discuss the classification of “pain of psychological origin” in the IASP taxonomy.

Attempted by 0 candidates

PASS RATE 0%

15.

Discuss the broad types of pain assessment tools used in paediatrics, and the patient factors that may influence pain assessment in a child.

Attempted by 16 candidates

PASS RATE 63%

SHORT CASES:

The Short Case section involved six patients - candidates were exposed to three.

PASS RATE 90%

Short Cases with Patients:

- Candidates had 10 minutes to be directed to a specific area to examine or to impart information.
- This section is a test of physical examination techniques or communication skills.
- Standards seem to be rising.
- Although some candidates did detailed sensory examinations there were still gaps in interpretation.
- Candidates need to be aware of safety. With an acute pain patient who was unstable only half the candidates protected the patient to prevent her falling.
- Candidates need exposure to a neurologist as part of their training.

The patients included:

Acute:

Mr JM 69 - Acute herpes zoster, mild dementia

Mr EH 59 - Methothelioma, recent thoracotomy

Cancer:

Miss HE - metastatic colon carcinoma, cervical nodes, upper limb weakness, brachial plexopathy

Mr PS 65 - SCC floor of mouth, DXRT, left sided cervical lymphadenopathy

Chronic:

Mrs LM 40 - Cervical disc, long tract signs upper and lower limbs

Mrs SS 80 - Right shoulder pain, advanced osteoarthritis

Communication Station:

This station involves an actor and is looking at communication skills. The candidate should not delve too much into the history. The history given should be all that is required.

The aim of this station is to encourage a generalised discussion of why suggested options are preferable. Informed consent may be required.

Details of the history, and the treatment plans are not necessary.

This year the objective of this station was for the doctor (candidate) to explain to the patient (actor), why an exercise based physiotherapy treatment was appropriate. The patient is keen to receive further “invasive therapies”. She is concerned as she is being advised to undergo an exercise program to learn to manage her pain. How can this possibly help with her pain? She knows it’s not in her head, it’s real. “Surely there is something you can do doctor?”

It was felt this station was handled well this year.

PASS RATE 95%

LONG CASES

There were 16 long cases.

Marks were given equally for History, Examination, Presentation of findings in a logical manner, and a Management plan.

The candidates and the patients were both advised to ignore the examiners.
Aim was to establish rapport with the patient.

- Supervisors of Training are reminded they need to sign off that candidates have done *five observed long cases under exam conditions* prior to presenting to the examination.
- As the long case mirrors a first consultation within a pain clinic, we believe it should be retained.
- An outline of “How to take a Pain History” is available in the NHMRC booklet, Acute Pain Management: Scientific Evidence.
- Candidates all have access to the Pain Orientated Physical Examination (POPE) DVD.
- Candidates need to practice long cases under exam conditions as time management is essential.
- Several candidates finished the history and examination within 40 minutes. They then didn’t seem to know what to do. When this occurred it was often found that there were large gaps within the histories they had elicited. Perhaps then candidates could be advised to clarify with the patients “are there any other issues?”
- Start with open-ended questions, ensuring that history taking is patient centred.
- In the long case (and also at the communication station), when candidates ask closed questions, they become too focused too early.
- Listen to the patient. Patients give important clues, which at times are missed by the candidates.
- Candidates failed to ask the patients what was wrong.
- Attention to the psychosocial history was good in some cases.
- Candidates should ensure that they give appropriate time to examining the main area / systems affected by the pain, and consider examining this first.
- Candidates should spend a couple of minutes only on the examination on the systems NOT involved in the main area of symptoms.
- Demonstrate empathy and sensitivity. (Recall this interaction is being observed.)

- Remember pain may not be the major issue, but more disability or psychological dysfunction.
- Candidates need to assess pain, function, co morbidity and underlying disease.
- Presentation should be structured and the discussion objective.
- In presenting their conclusions candidates should consider:
 - An initial brief summary of the most pertinent data.
 - Their analysis of this, reflecting their judgement regarding the priorities and relevance of issues.
 - Considered in relation to predisposing, precipitating, perpetuating and aggravating factors.
 - Management in accordance with the above.
- A sophisticated experienced candidate will present this information in less than seven minutes, even with a complex scenario, making use of the concepts outlined above, without needing to use the above terms.
- It is acceptable to indicate in your summary that there was particular information that you would have liked to obtain but did not. (Remember in real life we all may forget, and obtain the information at subsequent consultations.)
- Examiners need evidence that the candidate has the ability to be the leader of the Pain Team, and to manage the long case as if they were their own patient.
- Candidates are expected to finish their summary with a (biopsychosocial) diagnostic formulation and outline a management plan.
- Needs to be more emphasis on an **all round approach** to assessment, diagnosis, formulation, management and prognosis.
- Remember the patients who agree to be involved in the exam will be a reasonably select group. They will, as a rule, be “more than willing to please”. Candidates should use this advantage, and follow up on any clues given.
- The viva / case discussion sections were a problem for many candidates.
- It was felt that nervousness was a major issue.
- Most candidates waited to be questioned rather than leading the discussion with what they wanted to do, and what steps they would take next.
- Candidates should expect questions on:
 - Mechanisms.
 - What to do if pain progresses.
 - What are the main pathophysiological issues?
 - What are the main patient related issues?
 - What are the main management issues?
- Candidates need to look beyond the current management and ask what else could be offered. Do not assume because the patient has been to a Pain Clinic all that is possible has been done. Also do not assume the treatment that has been done so far is “best practice”. Be prepared to critically discuss the patients’ current management and what you may do that is different.

PASS RATE 55%

The patients included:-

- Mr GC 57 - BKA, cervical fusion, brachialgia, spinal cord stimulator
- Prof JB 73 - Incomplete tetraplegia, cervical spine injury
- Mr VT 67 - Diabetic neuropathy, failed spinal surgery syndrome, amputation for PVD
- Mrs SC 59 - Central post-stroke pain, wheelchair bound
- Mrs CB 49 - CRPS type 2, foot drop following sciatic nerve injury during total hip replacement for rheumatoid arthritis, depression, anger
- Mrs VE 52 - Bilateral rotator cuff problem, occupational overuse syndrome
- Mr HB 48 - Right brachial plexus injury and arm amputation
- Mrs GG 66 - Thoracic syrinx, lower limb dysaesthesiac
- Mrs DM 53 - Incomplete tetraplegia following diving accident 1979, shoulder pain
- Mrs WY 49 - Steroid-induced osteoporosis, painful diabetic neuropathy, Charcot’s feet
- Mr PK 55 - Multi-trauma, right radial nerve palsy, PTSD
- Mr GS 65 - Thoracic disc, long tract symptoms and signs.

STRUCTURED VIVA SECTION

The viva section consisted of three structured vivas and the investigation table.

STRUCTURED VIVA PASS RATE 75%

The introductions to the structured vivas were as follows:

Chronic scenario

A 28-year-old woman is referred to you with a history of recurrent, now persistent, pelvic pain. Currently she works as a pre-school teacher but has had to take increasingly long periods of time off work. As a small child she was found to have vesico-ureteric reflux in the context of recurrent urinary tract infections. At age 11, cystitis was diagnosed. She has had dysmenorrhoea since menarche at age 13. Subsequently she has had ongoing pelvic pain, worsened mid-cycle as well as with menstruation. Episodes of pain are accompanied by vomiting and urinary frequency.

She has been seen by gynaecologist and urologist, with three laparoscopies looking for endometriosis; none found at most recent laparoscopy. She has had several cystoscopies over time, with local diathermy some time ago and hydrodilation of the bladder more recently.

Drug treatment has included oral contraceptives, oxybutynin, mefenamic acid and naproxen. Short-acting oral opioids (immediate-release morphine, immediate-release oxycodone) have been associated with drowsiness.

She has been told that she has pelvic inflammatory disease and interstitial cystitis.

1. *What is your understanding of what is going on?*

Cancer scenario

74 year old man with asbestos related mesothelioma

Limited exposure – Home handyman

1 year history of slowly evolving left flank and upper abdominal wall pain

No initial respiratory signs

Admitted to hospital with severe pain despite oxycodone 400 mgm daily

Clinical findings:

T 7 to T10 intercostal sensory loss with severe neuropathic pain, patchy allodynia and hyperalgesia.

Mild dyspnoea on effort

Early Horner's Syndrome

1. *What assessment may help with the patient's management?*

Acute scenario

A 4 year old girl is in the Emergency Department with a hot water scald involving her chest and both arms (10% burn with some full thickness areas). The A & E staff have obtained venous access and given a 0.1mg/kg morphine bolus.

Both parents are with her. Her father is very agitated and anxious about his child's pain. The girl has stopped crying. However he is not satisfied, is demanding more pain relief and becoming verbally aggressive.

The A & E medical officer requests your assistance in managing the situation.

1. *What are you going to do when you get to the emergency department?*

Comments:

There was a general lack of anticipation of what would be asked.

Candidates should expect questions:

- Nature of the lesion.
- Anatomy.
- Possible therapies for current pain.
- Investigations to confirm your diagnosis.

In the *Chronic scenario* candidates tended to dismiss some aspects rather than confronting the issues. We do not want candidates to say in the exam they would just refer everything over to another specialist, the psychiatrist and the psychologist. What do these different individuals do?

In the *Cancer scenario* there was a surprising lack of a comprehensive care plan. Need to clarify what cancer treatments have already been given. Candidates did not focus on the anatomy the cancer type or the age of the patient. They tended not to answer the question.

Candidates needed to:

- Take notice to who referred the patient.
- Take responsibility for pain management.
- Fully elucidate the biopsychosocial approach rather than just paying lip service to it.
- Be careful as to which side the tumour is on and details of the history given.

The *Acute Scenario* asked candidates to cope with a patient in distress. Multimodal analgesia is a mantra. Candidates need to be able to explain to the examiners, as they would to patients, what they mean by the terms they use.

Investigations Station

Some candidates had no confidence in interpreting Xrays etc. Candidates need to attend regular Xray meetings. (eg weekly)

Experienced candidates moved quickly through this section and did extremely well.

Candidates did not use general knowledge.

If there is an obvious diagnosis, mention it as soon as possible.

Specific examples:

- Bone scans with metastatic disease
- MRI with epidural abscess
- Cervical scans with neurofibromata
- CT scan far lateral disc
- Retinal photograph with papilloedema

PASS RATE 75%

OVERALL COMMENTS

The standard of the candidates is slowly improving.

Candidates need to show empathy and understanding.

The pain physician is part of a team, but the Pain Specialist needs to be able to lead the team.

Be aware of what other members of the team can do and critically discuss their roles.

Candidates may irritate painful areas in pain patients. This was recognised by examiners and adjustments made.

Marks were also given for candidates recognising patients' sensitivities.

Candidates need to know when it is appropriate to probe and when not to, in both history and physical examination.

WRITTEN SECTION:

Not as well done as past years.

Examiners commented candidates do need SAQ practice also under exam conditions.

Hand writing was better this year.

As always candidates need to:

- Plan their answer so that it flows and they appear to have an organised approach.
- *Answer the question.* This year in two questions a number of candidates launched into an overview of what is multidisciplinary management, rather than answering what was specifically asked.
- Give succinct answers and not repeat themselves.
- Use headings and dot points if asked to discuss the answers briefly.
- Give definitions if asked to discuss some aspect. (eg personality and personality disorders or breakthrough analgesia) Do not assume examiners know what you understand by a term.
- Apply more commonsense thinking when answering the questions.
- Start answer with "I would do..." if asked to "outline your approach".

Other comments:

- In question 6 candidates talked about management rather than modern concepts.
- In question 13 candidates did not comment on concerns about NSAID's use with an acute illness with possible hypovolaemia. Candidates mentioned ketamine but did not say how they would administer it, and knowledge of buprenorphine pharmacology was brief.

Patients were this year asked what they felt. They were impressed with all aspects of the examination process. Some thought it may be interesting for patients to provide their own perspective on the interaction between them and the candidate.

PENELOPE BRISCOE

Chairman

Court of Examiners

December 2006

Distribution:

Faculty Board
of Examiners

Supervisors of Training
Registered Trainees

Examination Committee Court
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Education

APPENDIX A

QUESTION 1**COMPULSORY**

Write short notes on the pharmacology and side effects of local anaesthetic agents.

- Pharmacokinetics
Behaviour of the drug in the body (what the body does to the drug).
Half life, volume, distribution

 - Pharmacodynamics
Effects on the body (what the drug does to the body)
Absorption, distribution, metabolism, excretion, metabolism.

Esters and amides, absorption, toxicity, systemic blood levels, duration of action.

 - Patient Factors
Site of administration.
Intercostal greater than caudal, greater than brachial plexus.
Tissue Ph, pregnancy, paediatrics.

 - Drug Factors
pKa, ionisation, lipid solubility, protein binding.
 - Routes of administration:
topical, eye drops, amethocaine (ester),
EMLA to skin, buckle, mucosa, urethral.
Subcutaneous, nerve blocks, intravenous regional anaesthesia/analgesia.

 - Role of local anaesthetics in neuropathic pain.
Intravenous infusions, headaches. Local anaesthetic oral analogues, mexiletine.

 - Toxicity:
Allergic - esters, amides rare.
Local myotoxicity if large intra muscular doses

Systemic toxicity related to blood level - related to rate of absorption, related to site of injection,
Volume and concentration of drug = dose
central nervous system, mechanism unclear but neuronal desynchronisation leading to seizure then inhibition of inhibitory and facilitatory pathways and generalised CNS depression.
Circumoral tingling, fitting coma,
cardiotoxicity, Na channel block conduction slowing widening QRS complex arrhythmia, cardiac arrest.
- Treatment: prevention, supportive care
Ability to provide CPR/ALS when using doses of local anaesthetic
Possible role for intralipid
- Prevention: maximum doses in any four hour period:
Lignocaine 4 mg per kg.
Lignocaine with adrenaline 7 mg per kg,
Bupivacaine 2.0 mg per kg,

Cardiotoxicity: Lignocaine, ropivacaine, bupivacaine, isomer (levo bupivacaine) safer than bupivacaine,

Also include maximum safe doses for prolonged infusion e.g. 400mcg/kg/hr
Comment that these levels only safe if there are likely to be normal AAG levels etc

QUESTION 2

COMPULSORY

You are asked to give an expert opinion to the Medical Board in relation to the appropriate management of a patient (who is a Registered Nurse), with chronic backache. She is being prescribed sustained release morphine (300mg three times per day). The patient also receives frequent injections for breakthrough pain.

Outline the points that you would consider in formulating your reply.

Issues.

Requirements writing a report for a third party.

Opinions re the appropriateness of therapy.

What is "best practice" for an individual with this presentation?

In this scenario is this individual "safe" to be working.

Requirements writing a report for a third party.

The request to you should be in writing, with details of the information required.

Describe how you have obtained the information you use to write the report.

Your role is to assist the Medical Board and not act as an advocate for the doctor involved or the patient.

You have a duty to express professional and objective opinions

Detail your qualifications (i.e. why you are considered "an expert" in managing this type of patient.

Keep your opinions to your area of expertise.

In this scenario questions that need to be addressed would include:

Is this dose of medication improving the patients function and QOL?

Is there any evidence of misuse of the medication?

Is there any evidence of the patient diverting medication?

Is the patient taking it as prescribed?

900mg oral morphine large dose. (Ref Ballantyne)

Have blood levels ever been done to check compliance?

Have the possible side effects of such a large dose of opioids been discussed with the patient?

Drowsiness, confusion

Fluid retention, hormone imbalances, hyperalgesia.

Why is this patient requiring injections for breakthrough?

Opinions re the appropriateness of therapy.

Questions that need to be asked.

Why this dose of medication?

Is there any risk abuse and / or misuse?

Is these patients' pain even opioids responsive?

There is no indication to use injectable opioids for chronic pain. If breakthrough medication is needed why not oral??

What is the role of injectable opioids in the presence of such a large dose of morphine?

900mg = 300mg IM. Thus 10-30MG IM would have little effect. (Effect probably the euphoric effect of the IM route)

Has this patient any side effects of opioids, especially as she is on such a large dose.

What is “best practice” for an individual with this presentation?

It appears that this patient is using mono – modal therapy to manage their chronic pain. Has the patient undergone a multidisciplinary approach to their pain management?

What other medication / treatments have been trialled?

What other strategies have been employed to help the patient manage their pain.

Has the patient explored the psychosocial management of their pain?

Has any psychiatric issues been treated?

Depression/anxiety etc.

Have they undergone a physiotherapy assessment and looked at improving their fitness, function and strength.

Have they undergone a cognitive behavioural pain management programme?

In this scenario is this individual “safe” to be working.

It is a legal requirement to notify the Nurses Board if there are any concerns about this patient’s ability to perform their duties.

Issues of driving with such large doses of morphine, and the inconsistent blood levels that occur with the intermittent injections. How many injections / day, month etc?

In my practice I would feel very uncomfortable with prescribing the above doses of opioid, and can see no rationale as to why the patient still needs injectable opioids.

However to respond to the Medical board I would like to know the answers to the above questions. Although the case described here falls well outside what is considered “good practise” if all the questions I have raised are answered appropriately and there is evidence that the patient is functioning well the therapy may be appropriate.

References:

State Medical Board websites: Medicolegal guidelines.

Suresh: BMJ: 2002: 325: S111: 5TH Oct. Writing a Medicolegal report.

Ballantyne: NEJM: 2003: 349: 1943: Opioid therapy for Chronic Pain

QUESTION 3

COMPULSORY

Critically discuss current views on the possible importance of personality and personality disorders in chronic pain and their implications for treatment outcome.

Personality is usually defined as the totality of the individual's behavioural and character traits, attitudes and tendency to show particular emotional responses.

Personality disorders are defined as enduring patterns of maladaptive behaviour and responses that are inflexible and pervasive across a wide range of personal and social situations. Estimates of the prevalence of personality disorders vary between 5 and 10 per cent in the general community; they are higher among those with chronic pain attending pain clinics.

It is important to differentiate between personality traits or personality styles, and the presence of a diagnosable personality disorder.

Engel was one of the earliest authors to draw attention to the possible relationship between certain personality features and predisposition to the development of chronic pain. Among the significant personality features that he described were prominence of conscious and unconscious guilt; experience of pain as an atonement; history of suffering or defeat, and intolerance of success; a strong aggressive drive, usually unfulfilled; onset of pain at a time of real or threatened loss; onset of pain at a time of sexual conflict; and unconscious identification determining the site of pain.

Personality styles such as hypochondriasis and hysteria are common in chronic pain patients.

Prevalence of personality disorders is higher in chronic pain patients than in the general population, and it is also higher in medical and psychiatric patients.

"Conversion V" (neurotic triad) on MMPI tends to be associated with lack of "organic" findings in pain patients (elevation of hypochondriasis, depression and hysteria scales, with depression showing the lowest score).

Poor surgical outcome after back surgery predicted by elevated hypochondriasis and hysteria scales.

Low hypochondriasis score predicts better outcome with conservative pain management.

Among pain patients, personality disorder in 31-59 per cent, mainly DSM-III "Cluster B" (dramatic) and "Cluster C" (anxious). Most common were dependent (17%), passive-aggressive (15%), histrionic (12%) and compulsive (7%).

Borderline PD frequent (13%) in other studies, and associated with poor response to treatment.

Personality traits such as neuroticism and "concealed aggression" are associated with functional gastrointestinal disorder (recurrent abdominal pain and distress).

DSM-III-R: self-defeating PD in 20% of CRPS and 12% of disc-related radiculopathy patients – related to learned helplessness, guilt and self blame.

Personality styles such as “counterdependency” were found to be associated with chronic pain in the back and extremities, whereas alexithymia was found to be associated with chronic pain involving other regions of the body.

A recently published prospective study showed that higher scores on hysteria and hypochondriasis scales of the MMPI in college students predicted chronic pain complaints 30 years later.

Methodological problems: ? if measuring state or trait.

There is disagreement as to what are the “core” personality traits – different theoretical schools postulate different dimensions, and classifications such as DSM utilise pathological personality constructs.

Some studies used questionnaires, others used interviews.

Variety of instruments used, employing different definitions and constructs.

Some instruments, such as MMPI, include items reflecting physical status.

References

Applegate KL, et al. Does personality at college entry predict number of reported pain conditions at mid-life? A longitudinal study. *Journal of Pain* 2005; 6:92-97.

Engel GL. ‘Psychogenic’ pain and the pain prone patient. *Amer J Med* 1959; 26:899-918.

Gregory RJ et al. Personality traits related to chronic pain location. *Ann Clin Psychiatry* 2005; 17:59-64.

Tanum L & Malt UF. Personality and physical symptoms in nonpsychiatric patients with functional gastrointestinal disorder. *Journal of Psychosomatic Research* 2001; 50:139-46.

Weisberg JN. Personality and personality disorders in chronic pain. *Current Review of Pain* 2000; 4:60-70.

QUESTION 4**COMPULSORY****What are the principles underlying the prescription of breakthrough analgesia in different clinical settings?**

Given that this is a common clinical problem, the examiners were surprised how poorly the question was answered. Many candidates did not distinguish between 'different clinical settings' with resultant failure to acknowledge the controversy surrounding the prescription of breakthrough analgesia for non-cancer pain. The importance of assessment, the use of non-opioid including non-pharmacological techniques, and the need for reassessment/follow-up were often omitted.

Definition of breakthrough pain:

No definition universally accepted

Examples include:

- 'a transient increase in pain intensity over background pain' (1)
- 'pain that breaks through an existing analgesic regimen' (2)
- 'transient flare of pain superimposed on an otherwise stable pain pattern in patients treated with opioids' (3)

'Incident pain' is a subcategory of breakthrough pain.

Background:

This type of pain is typically rapid in onset, of moderate to severe intensity, but is generally self-limiting.

However, it has a significant impact on QOL, increases health costs, and is considered a negative prognostic factor (2).

Although a common occurrence (estimated approx. 65% of patients with cancer pain), there are few RCT upon which to base recommendations (2).

Breakthrough analgesia should be prescribed whenever long-acting/slow release opioids are administered for cancer pain.

Breakthrough analgesia may be required in a variety of clinical settings including for example:

- Cancer pain in patients with regular analgesia provided via a variety of routes (e.g. oral, transdermal, subcutaneous, epidural or intrathecal). This is the most commonly discussed clinical situation.
- Acute pain related to surgical or medical conditions and again with regular analgesia provided via a variety of routes (IV, oral, neuraxial and so forth)
- Its role in the management of persistent non-cancer pain is controversial. Some experts would advise that persistent non-cancer pain is best managed with non-drug and non-opioid strategies, and, if it is to be treated with opioids at all, with time contingent long-acting agents.

Principles of prescription of breakthrough analgesia:**ASSESSMENT**

- Prescription of breakthrough analgesia should be contingent upon a *comprehensive assessment* (history, examination and investigations as indicated; pain diary may be useful) looking for the aetiology of breakthrough pain.

- Disease progression is a common reason for loss of pain control in patients with cancer
- Other causes of breakthrough pain: predictable activity, end-of-dose failure, idiopathic.
- Need to assess
 - Frequency and duration of episodes.
 - Intensity.
 - Precipitants.
 - Previous and current treatments for baseline pain and effect of these.
- Also must identify exacerbating/maintaining psychological, social and spiritual/existential factors.

MANAGEMENT

- The management plan must include treatment that addresses the primary pathology (where feasible) and exacerbating/maintaining factors.
- The patient and the family/carers must be educated in the use of analgesia (e.g. use of breakthrough analgesia pre-emptively for an activity known to cause pain).
- Non-pharmacological measures - positioning, heat or cold, massage etc.
- Non-opioid agents (e.g. ketamine sublingually) may be useful.
- Optimise background analgesia – dosing and interval (e.g. for end-of-dose failure), adjuvants (e.g. for neuropathic or bone pain).
- The breakthrough analgesia should be of reasonably rapid onset and suitable potency.
- Route of administration
 - Determined by the condition of the patient and by pain severity.
 - Should be easy for the patient or carer to administer.
 - Oral route is often the route of choice, but may be contraindicated by the presence of dysphagia, nausea/vomiting, reduced conscious state and so forth.
 - Where pain is severe, it may be preferable to use routes with more rapid onset – IV, transmucosal (intranasal, sublingual).
 - Patient-Controlled Analgesia (PCA) may be useful.
- Dose is determined by reference to the 24-hour background opioid requirements. A common recommendation is to use the same drug (as the long-acting or slow release medication) in a quick release preparation at 1/6 of the daily background dose.
- A dose range may be required to allow titration against pain intensity.
- Dosing interval should take into account the duration to peak effect of the drug. In most cases, if the breakthrough dose is not effective at 30-60 minutes, it should be repeated (1).
- Regular review should be undertaken. This should include the amount of breakthrough analgesia required; if a large number of doses are required, the regular dosing schedule should be reviewed and revised. Pain diary helpful for this.
- Side effect review and management must always accompany the prescription of breakthrough analgesia.
- Only oral transmucosal fentanyl citrate has been shown in RCTs to be an effective management for breakthrough pain in cancer; the dose required is not related to the background analgesia dose (2).

References:

- (1) ANZCA and FPM. Acute Pain Management: Scientific Evidence. 2nd Edition, 2005.
- (2) Zeppetella G, Ribeiro MDC. Opioids for the management of breakthrough (episodic) pain in cancer patients (review). The Cochrane Library, 2006 Issue 2.
- (3) Mercandte S, Arcuri E. Breakthrough pain in cancer patients. Pain: Clinical Updates, IASP, volume XIV No 1, March 2006.

QUESTION 5

COMPULSORY

Briefly discuss the differential diagnosis and investigation of a 50-year-old man presenting with a 6-week history of right arm pain, starting in the shoulder and radiating down the posterior arm to the elbow.

Model answer:

This is a basic clinical scenario –

With left sided pain there would need to be consideration of ischaemic cardiac origin.

The main considerations are:

Right C6 or C7 root lesion

Facet joint arthritis with referred pain

Brachial neuritis

Pain of shoulder joint origin

Pain from structural lesions including neoplasm. (*This clinical pattern may arise from the middle segment of the brachial plexus but a history of trauma or involving neoplasms is likely*).

The most important part of evaluation is accurate clinical history and detailed physical examination.

The history should include: possible initial injury, past episodes of similar pain, provoking factors, relieving factors, accompanying sensory and motor symptoms and other areas of pain.

Examination should assess cervical movement restrictions, tenderness, provocation pain on rotation and lateral elevation, shoulder and arm examination and assessment for possible axillary lymphadenopathy.

Neurological examination includes motor, sensory and reflex assessment in both upper limbs and should also check lower limbs to exclude possible myelopathy.

Investigations:

Plain x-rays – cervical spine and shoulder.

Ultrasound evaluation of shoulder capsule and tendons is usually more helpful than plain x-ray—however; many patients will have abnormal shoulder ultrasound when pain arises from alternative sites.

CT scan of cervical spine –limited value but will show degenerative changes, possible neural canal encroachment and disk protrusion. May show soft tissue abnormality.

MR scan of cervical spine – most important but must correlate with clinical findings. Is best investigation to evaluate spinal cord and soft tissue lesions. May be the only way to identify a C6 or 7 nerve root neurofibroma.

Neurophysiological studies – EMG and nerve conduction studies useful when radiology is inconclusive or demonstrates multiple levels of pathology.

Electrophysiological studies are the most important investigation when brachial neuritis or a brachial plexus lesion is suspected.

The main differential diagnosis is often between C6 or C7 radiculopathy and brachial neuritis. Radiculopathy should be localised to a single myotome and matching dermatome. C5/6 disc degeneration is the most common followed closely by C6/7. Pain patterns may overlap. Most radiculopathies resulting from cervical disc disease occur in the 30 to 60 year age group and in the C-5 to C-7 region. Risk factors include heavy lifting, cigarette smoking and prior trauma to the neck.

Patients with acute cervical radiculopathy may present with their upper extremity supported by their head to counteract the cervical root distraction caused by the weight of their dependent extremity.

The clue to brachial neuritis is the involvement of multiple segments – (*note that brachial neuritis refers to an inflammatory patchy involvement of motor and sensory nerves along the arm—not just in the brachial plexus*).

Bilateral pain history does not distinguish a mechanical radiculopathy from an inflammatory process.

Brachial Neuritis -- Clinically, the presenting feature is abrupt and excruciating shoulder or upper-extremity pain, often with a nocturnal onset.

Most commonly, the pain is located at the lateral aspect of the shoulder or in the periscapular region, but its location varies with the involved nerve and can be most pronounced at the shoulder (*axillary nerve*), scapula (*suprascapular nerve*), lateral thorax (*long thoracic*), antecubital fossa (*anterior interosseous nerve*), or lateral arm and forearm (*musculocutaneous nerve*).

Although the pain may extend proximally or distally, shoulder movement rather than neck movement intensifies it.

The severe pain typically abates after 7–10 days or is replaced by a more persistent dull ache. At this point, true weakness may become apparent, as may significant muscle wasting. There is considerable clinical variation. Anterior interosseous involvement is the most common diagnostic clue at this stage.

About 50% of affected individuals report antecedent events, such as recent infection, unaccustomed exertion, childbirth, trauma, or an invasive medical or dental procedure. Motor NCS define the severity of damage in affected nerves and thus are useful as baseline prognosticators and for subsequent comparative measurements.

Neoplastic brachial plexopathies can be divided into primary (of brachial plexus origin) or secondary (originating outside the plexus). Primary brachial plexus tumours are rare and usually benign. Of these, nerve sheath tumours predominate. Most are solitary schwannomas or neurofibromas involving the upper or middle plexus.

Secondary neoplasms (usually breast or lung cancers) do so by means of extrinsic compression or infiltration from adjacent structures or spread from distant sites (metastases). When cancer involves the axillary lymph nodes, it may infiltrate the medial cord or nearby nerves (medial brachial cutaneous, ulnar, or median). Most patients present with severe and persistent shoulder and upper-extremity pain, followed by appropriate clinical deficits.

Radiation induced brachial plexopathies are generally painless lesions that usually present with paraesthesia involving one or more of the lateral three digits (i.e. lateral cord distribution).

References:

Brachial plexopathies: classification, causes and consequences.

Mark A. Ferrante, *Muscle Nerve* 30: 547–568, 2004

The variations of neuralgic amyotrophy. England JD. *Muscle Nerve*: 22:435– 436, 1999.

Tsairis P, Dyck PJ, Mulder DW. Natural history of brachial plexus neuropathy: report on 99 patients. *Arch Neurol*: 27:109 –117, 1972.

Peripheral Neuropathy: volume 1: eds: Dyck PJ, Thomas PK, Griffin J Low P & Pudulso J. – WB Saunders Philadelphia 4th edition 2005.

Most textbooks of general neurology.

QUESTION 6

NON COMPULSORY

Discuss modern concepts of chronic visceral pain.

Visceral pain

Differences from somatic pain:

difficult to localise; slowly recognised

limited repertoire of description (mostly by time leading to terms such as colic for repetitive pain of the same severity).

more likely to persist after cessation of stimulus

commonly referred to non-visceral structures

often accompanied by other symptoms of autonomic overactivity such as nausea, vomiting, sweating, hypotension and bradycardia as well as withdrawal

accompanied by negative emotions

Visceral nociception

Visceral innervation:

dual innervation

vagal or pelvic (to mucosa)

spinal ("splanchnic") (to muscle and serosa)

A-delta and C-afferents: low- and high- (20-25%) threshold mechanoreceptors; also thermo- and chemo-sensitive

both populations of mechanoreceptors sensitise

also innervated by "silent" afferents (MIA)

plasticity++

respond to stretch, traction, inflammation, ischaemia

Terminate in laminae I, II, V and X; ~10% of all afferent inflow to cord.

second-order neurons receive convergent non-visceral input

ascend in STT and PSDC pathways

afferents arborise widely; poor topographical representation

Most visceral afferent activity not perceived consciously

BUT subliminal stimuli activate cortical structures

Visceral hyperalgesia

Chemonociceptive information conveyed by vagus; sensitises

Different properties of nodose and DRG neurons

Dual innervation of distal colon and urinary bladder; associated with different sensations

Referred pain

Deep visceral pain

Referred visceral pain + secondary hyperalgesia: viscerovisceral and viscerosomatic referral

References:

Wesselman U, Burnett AL, Heinberg LJ. The urogenital and rectal pain syndromes. *Pain* 1997; 73:269-294.

Al-Chaer ED, Traub RJ. Biological basis of visceral pain: recent developments. *Pain* 96:221-225, 2002.

Gebhart GF et al. Visceral Pain and Visceral Hypersensitivity. In Flor H, Kalso E, Dostrovsky JO (eds). *Proceedings of the 11th World Congress on Pain*. Seattle: IASP Press, 2006. pp.285-300.

QUESTION 7

NON COMPULSORY

Write notes on the genetic influences on pain and response to therapies.

Considerable interindividual variability and differences in
Experimental pain – threshold sensitivity and tolerance to noxious pressure, electrical current, visceral and deep muscle pain
Clinical pain
Analgesic effects (efficacies, side-effects, tolerance liability)

Familial aggregation of pain related pathologies and pain sensitivities had been noted in humans
Influence of genes vs. environmental factors / familial modeling had always been debated
Heritability – proportion of overall phenotypic variance accounted for by all genetic factors
Likely that several genes combined to exert a small effect rather than a few genes with major effects
Heritability of Nociception ranges from 30-75%
Diseases where strong heritability had been demonstrated include:
Migraine 50%
Menstrual pain 55%
Low back pain 50%
Sciatica 20%
Carpal tunnel syndrome 40%

Ways to identify genes associated with trait variability
Linkage analysis
Follow familial inheritance patterns
Lead to identification of candidate genes
Association studies
Compare allele frequencies in defined populations

Pain can also be caused by a single mutation at a specific gene. Single gene pathologies accounting for pain had been identified:
Congenital insensitivity to pain (Hereditary sensory and autonomic neuropathy type IV)
Involved mutation in the gene encoding for the nerve growth factor-specific tyrosine kinase receptor (NTRK1)
Hereditary sensory and autonomic neuropathy type I & type II
Familial hemiplegic migraine
Involved mutation in the calcium channel $\alpha 1$ subunit gene in chromosome 19

Sex specific differences in pain behaviours and perception are due to existence of sex-specific quantitative trait locus in different genes which are associated with trait variability in each sex. Males and females possess at least partially independent physiological mechanisms underlying the traits in question. E.g. basal thermal nociceptive sensitivity display sex specificity for males and the non-opioid stress induced analgesia display sex specificity for females. A number of studies showed that males display higher thresholds, tolerance and analgesic sensitivity.

Variability in response to opioids e.g. morphine had also been studied.

Interindividual variability can be related to variations in way where morphine and its metabolite M6G interact with the mu-opioid receptor. Several nucleotide polymorphisms within the mu-

opioid receptor gene resulted in altered amino acid sequence thereby affecting the interaction between the receptor and morphine. An A118G polymorphism occurs in 10-14% of Caucasians and patients carrying the variant 118G allele had reduced effects of the opioid and homozygous patients require twice the morphine doses in order to achieve adequate pain relief compared to those who don't possess the allele.

Opioid analgesia can also be modified by the endogenous descending inhibitory adrenergic and serotonergic systems. As the catecholamines are metabolized by the COMT enzymes, polymorphism of the COMT genes will affect the metabolism of the catecholamines and hence opioid activity. For example, the enzyme containing the Met substitution has a 3-4 fold reduction in activity compared to the valine substitution. Patients with the Met/Met genotype have an increase density of mu-opioid receptors resulting in improved efficacy of morphine. Thus genetic variability in non-opioid systems may indirectly influence the clinical efficacy of morphine.

Pharmacogenetics may also account for response to certain opioids such as codeine. Its metabolism occurs via neuronal cytochrome P450CYP2D6. This enzyme is absent in about 7-10% of Caucasians who are thus unable to convert codeine to morphine by o-demethylation. As codeine produces analgesic effects by being biotransformed to morphine, these "poor metabolizers" will receive minimal therapeutic benefit from administration of codeine but are subject to its side-effects. They also report increased pain compared with "extensive metabolizers" in the cold pressor test.

References:

- Klepstad P et al. Genetic variability and clinical efficacy of morphine. *Acta Anaesthesiol Scand* 2005; 49: 902-908
- Sternberg W & Mogil J. Genetic and hormonal basis of pain states. *Best Practice & Research Clinical Anesthesiology* 2001; 15: 229-245
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- Mogil J. The genetic mediation of individual differences in sensitivity to pain and its inhibition. *Proc Natl. Acad. Sci. USA* 1999; 96: 7744-7751.

QUESTION 8

NON COMPULSORY

As a consultant in Pain Medicine, you have accepted an invitation to give a Post-Graduate lecture on the role of antidepressants in the management of chronic pain.

Discuss the points that you will present to your audience.

ANSWER:

Classification of anti depressant medication

Tricyclic antidepressants

SSRI

SNRI

NRI (*Reboxetine*)

Tetracyclic (*Mianserin, Mirtazapine*)

RIMA (*Moclobemide*)

MAOI (Best left to Specialist Psychiatrist prescription)

Adjunctive medication

Major tranquilizers

Mood stabilizing medication

Lithium

Anticonvulsant medications (*Carbamazepine, Valproate, Gabapentin, Pregabalin.*)

NON PHARMACOLOGICAL MANAGEMENT - a comment

It is common for Pain, Depressive and Anxiety Disorders to occur together.

There are many other remedies for both pain management and management of Depression that should be considered along with pharmacotherapy (physiotherapy, occupational therapy, education, psychotherapy, situational changes, and life changes.) Medication should be used in conjunction with the multidisciplinary approach.

INDICATIONS

Antidepressant medication and mood stabilizers are indicated for:

Treatment of specific Depression and Anxiety Disorders in association with pain

Symptomatic treatment (irritability, anxiety, insomnia)

For direct treatment of pain, in particular neuropathic pain (Level 1 evidence for tricyclic antidepressant Amitriptyline within NNT of 2.3.)

DOSE

Generally tricyclic antidepressants have been used in low dose, *although this has not been specifically tested as being better than usual doses used for treating Depression.* For example tricyclic antidepressants are often used in the dose range of 10 to 50mg per day instead of 150mg per night.

Amitriptyline is the most referenced and tested *although few studies have been done with other antidepressant medication. This is at least partly due to economics and patent legislation and not necessarily a reflection of lack of efficacy.*

Anecdotal research shows mixed results for other antidepressant medication with most promise for other Tricyclic antidepressant medication, Venlafaxine and Mirtazapine. These have been demonstrated to have an NNT of 4.5, in isolated studies.

The general consensus based on clinical use is that tricyclic antidepressant medication is more effective with respect to relief of pain than non-tricyclic antidepressant medication.

Tricyclics 25 to 300mg

SSRI 20 to 80mg

SNRI (Venlafaxine) 75 to 300mg

Mirtazapine 7.5 to 60mg

Moclobemide 150 – 900 mg

Mianserin 10 to 80mg

ADVERSE REACTIONS

A major problem with the tricyclic antidepressants is the considerable and more dangerous adverse reactions. These particular include:

Constipation

Weight gain

Orthostatic hypotension

Prostatic obstruction

Glaucoma

Sedation

Dry mouth

Sexual dysfunction

Cardiac arrhythmia (unsafe in immediate post infarct period, requires ECG monitoring)

Suicidal risk

It is important to take the suicidal risk of the patient into account before prescribing to ensure that adequate supervision and support is provided so as not to put the patient at greater risk.

The disadvantages for SSRI and SNRI medication are
nausea,

- hyperarousal (with insomnia)
- Serotonergic Syndrome: fever, myoclonus, autonomic instability (unstable blood pressure, tachycardia, sweating, gastrointestinal disturbance),
- disorders of conscious state (delirium, loss of consciousness, fitting)
- sexual dysfunction

INTERACTIONS

MAOI antidepressant medication has the potential for severe Hypertensive reaction to food containing Tyramine, requiring treatment as an emergency with Phentolamine, Chlorpromazine or Nifedipine.

Severe, fatal reactions have also been reported with Pethidine.

With the combination of Tramadol and ADT, there is an increased risk of fitting and Serotonin Syndrome.

The sedative effect of tricyclics is likely to be aggravated by other sedative medication including Narcotics, Benzodiazepine and Antipsychotic medication.

MANAGEMENT

It should be noted that there is delayed effect between commencement and effect, which may be up to two weeks. Benefit may continue to accrue over weeks to months although the effect for relief of pain would be evident before this time, usually within days.

The duration of effect is likely to continue, without tolerance, while the medication is continued.

It is appropriate to review the outcome of the trial of antidepressant medication at three to four weeks with the options of increasing the dose or changing the medication. This should be conducted after review of the diagnosis and prior management to ensure that adequate management of the underlying condition and other aspects of pain management has also been provided.

The use of antidepressant medication is not indicated for the treatment of general distress, or grief, particularly in the absence of other non-pharmacological measures.

There is a significant withdrawal response especially with SSRI/SNRI medication, such that gradual withdrawal is recommended for comfort and confidence of the patient. The withdrawal reaction is not medically dangerous, but uncomfortable.

THE PLACE OF ANTIDEPRESSANT MEDICATION

It is appropriate to initially trial conservative measures for pain management, and management of associated depression and anxiety.

It is important to initially evaluate the role and outcome of the use of analgesic medication, as appropriate. Relief of pain may alleviate any mood problems. If this has not occurred, the use of antidepressant medication is indicated for relief of pain, Depression and Anxiety Disorders, irritability and insomnia.

If this does not provide sufficient relief, use of adjunctive medication including antipsychotic medication and mood stabilizing medication can be considered, as is practised with respect to resistant depression.

Continued management includes initially weekly monitoring of use of medication for compliance, adverse reactions, and subsequent benefit as well as of the overall condition, with the frequency of review reducing over time, assuming progress and stabilization.

MOOD STABILIZING MEDICATION

Anticonvulsant medication, including Gabapentin and Pregabalin is being used particularly with neuropathic pain, with only emerging experience with mood disorders.

Lithium is not used specifically for treatment of pain syndromes.

Key:

Underlined is essential.

Non high-lighted is reasonably expected.

Italics are extra, impressive.

QUESTION 9

NON COMPULSORY

A 65 year old woman is referred with a 6 month history of painful burning sensations in her feet. A provisional diagnosis of erythromelalgia has been given.

Discuss the differential diagnosis and investigations that would determine your management program.

erythromelalgia -- clinical features/pathophysiology/differential diagnosis

***Erythromelalgia* is a term that describes the clinical syndrome of red, painful, hot extremities.**

- The lower extremities are involved more frequently than are the upper extremities.
- involvement is usually symmetrical.
- Symptoms can be intermittent or, more rarely, constant.
- The pain can be severe and debilitating.
- patients attempt to cool the affected areas.
- Primary and secondary forms of erythromelalgia have been described.
 - Polycythemia vera and other myeloproliferative disorders may underlie the secondary form.¹
 - erythromelalgia may precede a myeloproliferative disorder or systemic lupus erythematosus by months or years.
 - Small-fiber neuropathy is associated with erythromelalgia.²
 - Treatment is difficult;-- aspirin, nonsteroidal anti-inflammatory agents, anticonvulsants including gabapentin, tricyclic antidepressants, and vasoactive drugs have all been tried.
 - Response varies. Over time, the symptoms can worsen, stay the same, improve, or resolve in approximately equal proportions.
- Inherited erythromelalgia is also characterized by episodic burning pain in the distal extremities evoked by warmth.
 - causally linked with mutations of the Nav1.7 sodium channel, which is preferentially expressed in nociceptors.
 - Nav1.7 mutations within intracellular components of the channel substitute one uncharged residue for another within an S4 segment of the channel. These changes should increase excitability of nociceptive dorsal root

ganglion neurons in which the mutant channel is present, thus contributing to pain.

- Histopathologic findings in primary erythromelalgia are nonspecific: special studies show a decrease in small nerve fiber density. Vascular thrombi were not identified.

The management of erythromelalgia is difficult and frequently involves a multidisciplinary approach.

No treatment is consistently effective in the management of patients with erythromelalgia.

There is a dearth of adequate studies examining the response of erythromelalgia to treatment.

Most recommendations are suggested based on case reports, small case series, and anecdotal reports.

An approach to management of individuals with erythromelalgia includes patient education, learning to avoid episodes, relieving discomfort of the episodes, controlling secondary and underlying factors, and use of drugs used to control pain.

- calcium channel blockers
- aspirin
- lignocaine – I/V or S/C for intense pain
 - topical --+/-ketamine -- useful in children
- mexiletine
- tricyclics
- AEDs -- pregabalin

References:

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2. Davis MD, Sandroni P, Rooke TW, Low PA. Erythromelalgia: vasculopathy, neuropathy, or both? a prospective study of vascular and neurophysiologic studies in erythromelalgia. *Arch Dermatol.* 2003;139:1337-1343.
3. Davis MD, O'Fallon WM, Rogers RSIII, Rooke TW. Natural history of erythromelalgia: presentation and outcome in 168 patients. *Arch Dermatol.* 2000;136:330-336.
4. Choi JS, Dib-Hajj SD, Waxman SG. Inherited erythromelalgia. Limb pain from an S4 charge-neutral Na channelopathy. *Neurology.* September 20, 2006
5. Buttaci J. Erythromelalgia: a case report and literature review. *Pain Medicine* 2006;7:534-538.

QUESTION 10

NON COMPULSORY

Discuss the pathogenesis and management of rebound headache.

This clinical problem is classified as medication withdrawal headache in the International Headache Society classification of headache (IHS 2004)

The medications known to be associated with medication withdrawal headache are analgesics (simple and opioid), ergotamines, triptans, barbiturates and caffeine containing preparations.

These substances do not cause withdrawal headache in nociceptive or neuropathic pain syndromes or in some common headache syndromes such as cluster headache

The causes of medication withdrawal headache are unknown

Speculation about causation usually invokes theories with application to the mechanisms of pain amplification in other pain syndromes. These include cellular adaptation to central sensitization, and effects on inhibitory pathways. These are unlikely to be the explanation given the unique nature of medication withdrawal headache.

Other highly speculative mechanisms seek to involve unknown roles of the periaqueductal gray in inhibitory mechanisms and altered serotonin receptor function

The management of medication withdrawal headache overlaps with that of chronic daily headache.

Management is multifactorial:

Exclude secondary causes

Classify the primary headache disorder

Recognise and ascertain the degree of medication over use

Discontinue the offending agent -- this may be difficult and will require education and behavioural management, alternative pain control and may possibly require hospitalisation.

Co morbid medical and emotional conditions must be addressed.

Co morbid medical states may preclude some treatment options.

Strict limits must be set to avoid recurrence of medication withdrawal headache and alternative medication (e.g. substituting NSAID for triptan or ergotamines will eventually cause a new rebound state.) A preventive medication is nearly always required -- tricyclic, beta blocker, AEDs including valproate, gabapentin and topiramate (*class one evidence for each*).

Hospital management depends on intensity and duration of headache. Detoxification may include supportive measures and treatment of withdrawal symptoms.

Intravenous or subcutaneous lignocaine infusions are part of hospital management-this may allow sufficient time for the patient to cope with acute analgesic withdrawal but it is not a specific treatment of headache.

References:

Lipton R P. et al. Classification of primary headaches. Neurology 2004, 63:427-435

Pageler et al. Medication overuse headache Current Pain and Headache Reports 9:430-435,2005

Cupini LM and Calabresi P Medication overuse headache: pathophysiologic insights. J Headache and Pain 6:199-202,2005

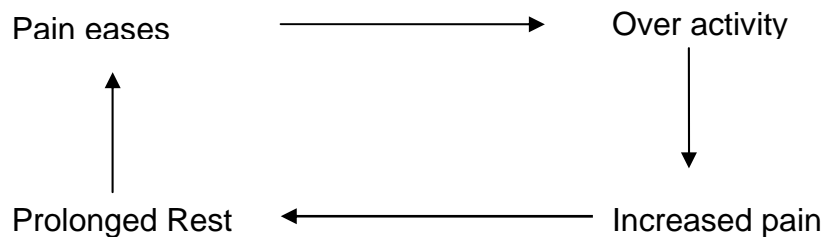
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QUESTION 11

NON COMPULSORY

Discuss the role of Activity Management (Pacing) as it applies to the management of patients with prolonged pain.

Patients living with persistent pain often fall into a cycle of over and under activity,
Causes increase frustration with their pain and limitations
Tend to push themselves beyond their tolerance levels
When pain does cease their activity – prolonged rest periods (Gil et al 1988)
Pattern repeated causing a boom-bust cycle of activity



Physical and psychological problems associated with boom-bust cycle include

Periods of inactivity result in increase deconditioning
This increases the frequency of flare-ups
Less physical activity is then required to produce increases in pain
Rest periods then increase in frequency and duration with further reduction in physical activity
Loss of personal power, reduced self-efficacy and development of self-esteem difficulties
Social and relationship difficulties produced by reductions in physical activities
Mood disturbance, reduced distress tolerance and disturbed sleep may occur
These difficulties interfere with effective pain coping
Increases intensity of perceived pain may result
Increase flare-ups strengthen fear avoidance patterns
Reluctance to engage in physical activity increases

Measurement

Nielson et al conceptualised activity pacing as an active strategy for coping with pain and developed a brief therapeutic scale incorporating the management principles
Carne et al (2005) have developed a Pain Patterns of Activity Questionnaire and showed that it is poorly utilized after a pain program (<60%) Women used it less. But if used it was associated with less depression and fear of re-injury but no improvement of pain intensity, disability or activity level

Management

Primary goal is to break the “boom-bust” cycle
Pacing and goal setting techniques aim to prevent overdoing of physical activity
Limit the amount of time spent resting
Maintain a moderate activity-rest cycle throughout the day
Gradual controlled increases in activity levels reduce flare-ups (and therefore avoidance activity).

Activities are paced by timing and/or the introduction of exercise quotas interspersed with periods of rest or alternate activity (Gil et al 1988, Fordyce 1976, Keefe et al 1996)

Activity pacing involves several steps

Calculation of a baseline level for each type activity

Establishment of target levels for each type of activity which generally start at 10-15% less than baseline

Setting specific time goals for activity-rest cycles. Each cycle consisting of a period moderate activity performed at the target level and a limited rest period. Daily activities are paced according to this cycle

As pain coping and fitness level improve, the activity part of the cycle is gradually increased while resting component decreased

Close association between psychologist and physiotherapist

Activity pacing and goal setting strategies have been shown to effectively increase activity tolerance and adaptive pain coping and reduce levels of physical and psychological disability (Turner and Clancy 1988, Nicholas et al 1991, Vlaeyen et al 1995, Linton 1986) in patients with persistent pain

References:

Fordyce WE (1976), Behavioural methods for chronic pain and illness. St Louis CV Mosby

Gil KM, Ross SL, Keefe FJ. Behavioural treatment of chronic pain: four management protocols. In France RD, Krishman KRR (Eds) (1988) Chronic Pain. Washington: American Psychiatric Press

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Cane D, McCarthy M, Lynch ME Prevalence of pacing in patients attending a multidisciplinary pain treatment program. Pain Res Manage 2005

QUESTION 12

NON COMPULSORY

Discuss the evidence base for the addition of adjuvant medication to intrathecal opioid infusions.

Surveys show an increasing trend away from intrathecal (i.t.) administration of a single opioid towards co-administration of two or more drugs for example morphine with clonidine and bupivacaine as adjuvants. The term combination analgesic chemotherapy has been coined to describe this trend.

Reasons for addition of adjuvants include:
cases where intraspinal opioid fails to adequately control pain
side effects associated with I.T. opioid use
the development of tolerance to spinal opioids
predominant neuropathic components
In all cases of inadequate pain control,
pump functioning should be checked
catheter integrity and placement must be ensured
progression of underlying disease, presence of intraspinal granuloma or new "red flag"
conditions identified
psychosocial factors should be addressed.

The "evidence base" for an adjuvant drug to be administered as part of an intrathecal opioid infusion must include

evidence of safety with thecal, intrathecal and other body systems as these drug are usually administered over the long term.

evidence of efficacy ideally in randomised controlled trials

evidence that the adjuvant drug is stable at body temperature (37 degrees celsius) for the period between refills

compatibility with the pump and catheter

evidence of drug-drug stability where drugs are co-administered

Uncontrolled case series and case reports form the majority of the literature on the clinical use of intraspinal drugs and preclinical and clinical trial data is often lacking. To address this an "Expert Panel" reviewed the literature and published an algorithm arranging intrathecal drugs in a hierarchy based on evidence of safety, efficacy and broad clinical experience (Hassenbusch 2004).

Studies on adjuvant medications have focused on the addition of bupivacaine and/or clonidine to the first line drugs -morphine and hydromorphone.

The "expert panel" considered the adjuvants, bupivacaine or clonidine be added as second line therapy if morphine (up to 15mg/day, maximum concentration of 30mg/ml) or hydromorphone (up to 10mg/day, maximum concentration of 30mg/ml) provided inadequate pain relief . These upper limits have been recommended due to evidence of dose- and concentration-dependant risk of catheter tip granuloma formation.

It was advised that (Hassenbusch 2004).

the concentration and dose of bupivacaine should be kept as low as possible to maintain adequate analgesia due to lack of certainty regarding safety

the bupivacaine dose should be kept in the range of 2-30mg/day

the maximum recommended concentration of bupivacaine is 38mg/ml (3.8%) based on an aqueous solubility limit of 40mg/ml.

Principal side effects of bupivacaine include lower extremity motor weakness and sensory loss, bladder dysfunction and sympathetic blockade.

Clonidine

is an alpha-2-agonist has been shown to be clinically effective for both nociceptive and neuropathic pain.
is used in non-malignant pain although it is only approved by the US FDA for epidural use in cancer pain.

side effects include hypotension, bradycardia and sedation.

recommended dosage range is 10µg-1000µg/day with treatment initiated at relatively low dosage (most patients' 100µg/day and older and frail patients at 10µg/day)

A combination of morphine or hydromorphone with clonidine and bupivacaine was recommended as third line therapy.

In addition the Faculty of Pain Medicine guidelines recommend that the administration of all "off-label" drugs require patient education and consent.

The drug appears to have a narrow therapeutic index and common side effects are dizziness, nausea, nystagmus, gait imbalance, confusion, constipation, and urinary retention. These adverse events resolved with dose reduction or discontinuation.

A range of other drugs are recommended if the earlier strategies are not successful but available data is mostly for their use as stand-alone agents and not as adjuvants although surveys suggest that mixtures of these drugs are being used. Ziconitide is an N-type calcium channel antagonist that reduces pain in both acute nociceptive and neuropathic pain. The FDA has approved this drug for intractable pain in those for whom intrathecal infusion is appropriate and has failed more conservative measures and i.t.morphine. Baclofen is safe and approved for long-term intraspinal treatment for spasticity but data for chronic pain use is limited. The other drugs in this group; fentanyl, sufentanil and midazolam are used in clinical practice despite a lack of long-term safety and efficacy data. Other compounds used intrathecally include neostigmine, adenosine and ketorolac but there is limited pre-clinical and clinical data so caution is recommended. Lastly drugs such as pethidine and gabapentin have insufficient preclinical data to support clinical use.

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QUESTION 13

NON COMPULSORY

A 35 year old man taking buprenorphine 16 mg per day presents to the emergency department following a motorbike accident in which he sustained a compound fracture of his tibia and fibula and a pelvic fracture.

Outline your approach to pain management in this patient and comment on any factors that might affect your ability to provide effective and safe pain relief.

ANSWER

Because of the dose of buprenorphine this man is taking, it is assumed that he is in an opioid substitution program because of a substance abuse disorder (SAD), or addiction, involving opioids.

Effective management of acute pain in this patient may be complex and needs to include consideration of a number of factors including issues relating to both his SAD and his injuries.

ISSUES RELATING TO HIS SAD

These include his:

Tolerance to and dependence (physical) on opioids

Treatment with buprenorphine and prevention of withdrawal from buprenorphine

Prevention of withdrawal from any other recreational drugs he might be taking

SAD

a) Tolerance and dependence

This man is tolerant to opioids (buprenorphine) and is likely to require much higher doses of opioid than an opioid-naïve patient after a similar injury.

He is also likely to be physically dependent so that continued use of an opioid (buprenorphine or an alternative in adequate doses) will be required in order to suppress signs and symptoms of withdrawal.

b) Treatment with buprenorphine and prevention of withdrawal

Buprenorphine is a partial opioid agonist increasingly being used in the treatment of an opioid SAD. As yet, there are no good data on which to base the management of patients on buprenorphine maintenance programs requiring pain relief.

A decision needs to be made whether or not to continue buprenorphine (the drug is given sublingually and so can still be given to patients who are fasting). In practice, there appears to be little problem if the buprenorphine is continued, and acute pain managed as outlined below. To prevent withdrawal he must either have his buprenorphine continued or another opioid substituted in appropriate (equivalent) dose.

c) Prevention / treatment of withdrawal from any other recreational drugs

If he is taking any other recreational drugs he may be at risk of withdrawal from them.

Withdrawal from amphetamines can lead to marked sedation and consequent difficulties in safely obtaining adequate analgesia with opioids. There is no treatment for amphetamine withdrawal.

If patients are withdrawing from drugs that put them at risk of seizures (e.g. benzodiazepines) other drugs that are known to lower seizure threshold (e.g. tricyclic antidepressant agents, tramadol) should be used with care. Withdrawal from benzodiazepines and alcohol can be managed with benzodiazepines, but this may increase the risk of respiratory depression in patients requiring opioids, especially in high doses.

Clonidine, in doses of 25-50 mcg tds (oral or SC) will help with pain relief and the management of withdrawal.

d) Substance abuse disorder

Possible problems related to his SAD that might affect his pain management include those related to:

Certain psychological and behavioural characteristics that may be associated with a substance abuse disorder as these patients have a psychological as well as a physical need for the drug. This patient may therefore exhibit some aberrant drug-taking behaviours, although this is not always the case. It is important that any existing aberrant behaviours are managed well and potential behavioural problems averted.

The patient should be assured that staff will aim for good analgesia. However, he needs to know that when opioids are used, safety is paramount and the onset of sedation or other significant side effects may prevent further dose escalation.

Individualised treatment plans that help with effective and safe yet compassionate treatment can benefit patients who may exhibit significant aberrant drug-taking behaviours.

These treatment plans, which should be firmly applied, may include realistic goals for analgesia (complete pain relief is usually not realistic), expected duration of treatment, plans for dose reductions and choice of drugs available. The dangers associated with tampering with equipment, or the use of illicit drugs in addition to prescribed medications, should also be explained. Commonly, such patients are willing to acquire the drug by deception or by illegal means outside hospital and this may continue (albeit uncommonly) while an inpatient (e.g. friends may bring drugs in).

All medical and nursing staff involved in treating the patient should agree with and adhere to the plans. Plans should also be discussed with the patient.

Close liaison with drug and alcohol services and other treating clinicians is recommended.

Presence of the drug (or drugs) of abuse

Polyabuse (e.g. involving alcohol, amphetamines, and benzodiazepines) is common

Medications used to assist with drug withdrawal and/or rehabilitation

He is taking buprenorphine (see above)

Complications related to drug abuse including organ impairment and infectious diseases

He is at increased risk of diseases such as Hep B and C, which could affect his ability to take paracetamol and NSAIDs, and HIV/AIDS

ISSUES RELATING TO MANAGEMENT OF PAIN DUE TO HIS INJURIES

Management of this patient should focus on effective pain relief, both generally and specific to his injuries.

General management

Where possible, it is wise to check the dose of buprenorphine with the prescriber or dispensing chemist. In addition, the state department of health will also have a record of this authority for prescription and will advise of any problems that have been noted in the past (e.g. diversion of drugs).

In general, multimodal analgesic regimens will be of most benefit and the use of non-opioids and regional analgesic techniques should be maximised in this patient.

This patient will require additional opioids for analgesia. IV PCA is a useful modality for pain relief in these patients although larger than "average" bolus doses will often be needed. 16 mg buprenorphine a day is approximately equivalent to 200 mg IV morphine (approx 8 mg/hr). If buprenorphine is not continued, a background infusion of an equivalent dose of morphine would be needed. Bolus doses could start at 4mg or 6mg or even 8mg but, as very high morphine doses may be required, use of a drug such as fentanyl that will not lead to high levels of an active metabolite, may be preferable.

Tramadol may also be of use, although its sole administration *instead* of any opioid is not recommended as it will not prevent opioid withdrawal. In addition, the total doses required in opioid-tolerant patients may exceed recommended doses. It would be reasonable to give 100 mg every 4 to 6 hours on a regular basis.

Epidural analgesia may be effective. The amount of opioid commonly added to epidural solutions will be inadequate to prevent opioid withdrawal and continuation of the buprenorphine or adequate doses of an alternative opioid will be needed in addition.

Ketamine may attenuate tolerance. For this reason, ketamine administered in low doses of 50–200 mg per 24 hours (the lower doses used in the older patients) by IV or SC infusion may be a useful adjunct in some opioid-tolerant patients, with few, if any, side effects. Ketamine is a drug of dependence and infusions should be delivered using a pump that can be locked so that there can be no unauthorised access of the drug.

In the absence of contraindications, regular paracetamol and NSAIDs should be given. If oral opioids are required later, liquid preparations of the drugs (e.g. oxycodone syrup) may be preferable to reduce the risk of opioid diversion.

Management relating to his injuries specifically

Pain issues relating specifically to his injuries include that:

There is a risk of compartment syndrome following his fractured tibia and any unexpected increase in pain of opioid requirements means he should be reassessed asap.

He is at risk of nerve injury following his fractured pelvis and this may lead to acute neuropathic pain, requiring appropriate treatment (e.g. ketamine, TCAs, tramadol, anticonvulsants).

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QUESTION 14**NON COMPULSORY**

Discuss the classification of “pain of psychological origin” in the IASP taxonomy.

The first edition of the “Classification of Chronic Pain” was published by the IASP in 1979. The second edition, prepared by the Task Force on Taxonomy, was published in 1994. It remains the official system of classification of chronic pain put forward by the IASP.

The IASP classification provides a detailed description of pain syndromes, dividing these into relatively generalised syndromes and into relatively localised syndromes; the latter are further subdivided according to anatomical areas, such as the head and neck, upper and lower limbs, chest, abdomen, spinal pain, and so on.

Pain of psychological origin is described in the IASP classification as one of the relatively generalised syndromes. The IASP classification recognises four types of “pain of psychological origin”, namely that associated with muscle tension, delusional or hallucinatory pain, pain of hysterical (conversion) or hypochondriacal origin, and pain associated with depression.

Muscle tension pain is defined as virtually continuous pain in any part of the body, due to sustained muscle contraction and provoked by emotional causes or by persistent overuse of particular muscles.

Delusional or hallucinatory pain can also occur in any part of the body. In this condition the pain cannot be explained by any objectively demonstrable organic cause, and it is attributed by the patient to a specific delusional cause.

Pain of hysterical or hypochondriacal origin is specifically attributable to the thought process, emotional state, or personality of the patient in the absence of an organic or delusional cause. Pain of hysterical (conversion) type may be associated with other physical complaints that are without a physical basis. These might include pseudoneurological symptoms such as paralyses or weakness, gastrointestinal, cardiovascular (palpitations, shortness of breath), or disturbances in sexual function (impaired libido, reduced potency). In the hypochondriacal type of pain there is excessive concern or fear of the symptoms, and a conviction that disease is present despite careful explanation and reassurance based on a thorough evaluation.

Pain associated with depression occurs in the course of a depressive illness; it usually does not precede the depression and cannot be attributed to any other cause. It is frequently associated with anxiety and irritability. It is important to differentiate depression causing pain from depression that might arise secondary to chronic pain due to a physical cause.

QUESTION 15

NON COMPULSORY

Discuss the broad types of pain assessment tools used in paediatrics and the patient factors that may influence pain assessment in a child.

Background

To manage pain in children, adequate pain assessment is essential. The assessment instruments used must be practical, reliable, valid and appropriate for the child's development stage. Three dimensions are typically assessed:

1. Self-report of pain intensity
2. Behavioural reactions
3. Physiological reactions.

Since pain is subjective, self-report is considered the gold standard, by which all other assessment tools are judged. Children are usually able to differentiate gross levels of pain intensity from the age of three, and by using self-report scales, and should be able to complete simple grading tasks such as ordering blocks of various sizes, or moving a koala up a pole.

Two commonly used methods of self-report are the visual analogue scale and the faces scale. Visual analogue scale is similar to that used in adults and is a ten centimetre line with the ends marked typically as no pain or worst pain possible. Scores range from zero to 100 millimetres. The minimum clinically significant change in the visual analogue scale score is 10 to 13 millimetres. This type of scale can easily be used by children as young as 7 years.

The faces pain scale generally consists of 5 to 9 faces, ranging from happy to neutral, which is no pain, to sad and distressed, which means the worst possible pain. Scales vary in the number of faces, and whether the "nil pain" face is smiling or neutral. In most cases cartoon-like characters are used, in others realistic drawings or actual photos of faces are used. The minimum clinically significant difference is one face. It has been suggested that 6 faces is an optimal configuration because the scores can then be compared easily to the visual analogue scale with each face corresponding to 0, 2, 4, 6, 8, 10 centimetres. Neutral anchors are more valid for rating pain intensity. Smiling and tearful anchors introduce an emotional component to the pain rating. Young children's scores must be interpreted with caution because they are more likely to choose the extremes of scales i.e. 0 or 10. Examples include the OUCHER; Baker Wong faces scale or the Faces Pain Scale-Revised. A number of these scales have undergone extensive psychometric testing and have been validated in children of different racial origins.

For younger or non-communicating children, behavioural scales are used, however all the behaviours rated are not specific for pain.

Behaviour such as varying facial expressions, crying, movements e.g. kicking, verbal protests and the need for restraint are deemed to represent painful stimuli. Some children may be able to control their behaviour, however this results in poor correlation with their self-reported pain. Behavioural rating scales are also used with developmentally delayed and other non-communicating children. An observer-rated visual analogue scale for parents or health care workers is commonly used and based on observer's assessment of the children's pain behaviours, however this often correlates poorly with children's self-report.

In the assessment of postoperative pain in children with cognitive impairment scores on the FLACC scale i.e. faces, legs, activity, crying, and consol ability scale, correlate with parental pain report and were reduced after analgesia.

In children with cognitive impairment and or communication problems assessment of pain is difficult and can contribute to inadequate analgesia.

Physiologic changes are inconsistent and should be used only as cooperative data.

Changes in physiological parameters associated with procedural interventions are assumed to indicate the presence of pain and these include increased heart rate respiratory rate blood pressure intracranial pressure cerebral blood flow and palm sweating. Others include a decrease in transcutaneous oxygen saturation or transcutaneous carbon dioxide tension and changes in vagal tone. As these changes are reduced by analgesia they are also useful surrogate outcome measures of pain but their sensitivity and specificity will be influenced by concurrent clinically conditions such as increased heart rate due to sepsis and other factors such as distress, environment and movement.

Multidimensional assessment gives the most complete picture of a child's pain response consistency of scales used within the health care setting is essential.

Many scales incorporated both psychological and behavioural parameters determine the overall pain score and may result in a more comprehensive measurement. No single scale has been shown to be clearly superior or be universally adopted over another scale.

Pain Assessment and measurement are important components of Paediatric Pain Management. Pain measurement tools are available for children of all ages and these tools must be matched to the child's age development and clinical context in which it is used and explained to the child and it should be used consistently.

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EXPECTED POINTS

Need for an assessment tool

The assessment tool needs to be age appropriate, reliable and validated in that setting

Self report is the gold standard e.g. visual analogue or faces scales, with:

mention the age groups in which these tools can be used

mention the number of faces used and neutral anchors

mention about correlation of faces and visual analogue scales

Behavioural scales are used in younger non communicating individuals, as well as those children with cognitive/physical impairment with:

list some of the parameters evaluated and how these may underestimate the overall pain level

mention the unreliability of observer assessment

mention that this may lead to inadequate analgesia

Physiological changes

List the major parameters used

their reliability/unreliability

need to be used with other assessment tools

Multidimensional pain assessment

a combination of multiple assessment tools to give a clearer picture of the pain complaint or level of distress.

none shown to be any better than any other.