

**THE DETERIORATING PATIENT
DISCUSSIONS AND LEARNINGS
FROM A CORONIAL CASE**

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CASE HISTORY

As much of the learning in a case history presentation, is you thinking about what you may do in that situation



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We do not look at the cases to mock, but only to learn and hopefully teach others how to respond in these difficult situations.

It is very easy to see things more clearly when looking retrospectively but would have been very difficult at the time of care for all the staff.

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INCIDENTS OF ESCALATION OF CARE

- This is a part discussion from a transcript from an Australian coronial case that was accessed via public documents.
- It was the families wish that this case be deidentified, and the lessons learned be used in specific learning and education.
- This is a very complex case: only some salient learnings have been highlighted to assist in the education of perianaesthesia nurses

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POST ANAESTHETIC CARE UNIT

Setting the scene

The first two hours in Post Anaesthetic Care Unit (PACU)

- Ms S was admitted to the PACU at 19:57 following an Endoscopic pyeloscopy with laser lithotripsy to remove a large staghorn calculus
- The procedure commenced at 15:30
- Ms S was accompanied to the PACU by the anaesthetist and anaesthetic nurse at 19:57
- Operative care was handed over to the PACU nurse
- Ms S had a laryngeal mask and jaw support

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POST ANAESTHETIC CARE UNIT

- The experienced PACU nurse observed Mrs S skin colouration was 'mottled' and that her respiratory rate was high (Salient point 1)
- The anaesthetist told her that Ms S may be in pain because of the size of the kidney stone which was removed
- The anaesthetist administered propofol 40 mg to reduce Ms S's respiratory rate and oxycodone 5 mg for pain relief
- Ms S's respiratory rate then reduced to around 20-22 breaths per minute

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POST ANAESTHETIC CARE UNIT

- At 20:00 the PACU nurse commenced monitoring Ms S's blood pressure, heart rate, respiratory rate, oxygen saturation and flow rate, temperature and level of sedation on a continuous basis
- Due to the poor skin colour, the PACU nurse expected Ms S's oxygen saturation level would be very low but was surprised when the oxygen saturation level recorded at 20:00 was 96%
- As the anaesthetist was satisfied that Ms S was now stable and that her oxygen saturation and respiratory rates were normal, the anaesthetist returned to the theatre for the final procedure of the list which commenced at 20:08 (Salient point 2)

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POST ANAESTHETIC CARE UNIT

- At 20:55 the PACU nurse became concerned that Ms S's systolic blood pressure had fallen to 94 as her preoperative baseline level was 159 (Salient point 3)
- The PACU nurse believed that even taking into account that the preoperative blood pressure reading might have been elevated because of anxiety, the reading at 20:55 was, in her opinion, significant
- The nurse contacted the anaesthetist by telephone and told him of her concerns about the B/P and that the heart rate was still slightly elevated.
- The anaesthetist ordered an increase in IV fluids to 250 mls per hour

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POST ANAESTHETIC CARE UNIT

- Ms S did not have a catheter in place and the PACU nurse was concerned that Ms S hadn't passed urine (Salient point 4)
- Ms S complained of feeling cold. Her toes were cold to touch. A Bair Hugger was applied
- At 21:10 Ms S's blood pressure was 91/67 but, by 21:20, it had dropped to 81/53 (Salient point 5)
- The PACU nurse contacted the anaesthetist for a second time
- At the time she gave her oral evidence, the PACU nurse had no specific recollection of that call but relied on the fact that she had documented it (Salient point 6)

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POST ANAESTHETIC CARE UNIT

- The anaesthetist instructed her to give Ms S a fluid challenge of 500mls
- The PACU nurse did not tell the anaesthetist on the telephone, that Ms S was complaining of feeling cold and that her toes were cold to touch. When asked why she did not do so, she said: it was difficult to communicate as the anaesthetist was busy in the middle of a case (Salient point 7)
- At 21:34 the PACU nurse attached ECG leads to monitor Ms S cardiac function. When asked why she did that, she explained because of the fact that she wasn't improving, I felt that I needed to escalate my interventions with her (Salient point 8)

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POST ANAESTHETIC CARE UNIT

- At 21:40 the nurse was concerned about the oxygen saturation level of 91% and reapplied the Hudson mask.
- She was also concerned that Ms S's blood pressure continued to drop after the 500ml fluid challenge as at 21:40 was 89/63 (Salient point 9)
- She contacted the anaesthetist again and he ordered 500mls of 4% albumin to commence immediately
- He told the PACU nurse that the procedure in the operating theatre was finished, that he was about to transfer that patient to the ICU and that he would organise a bed for Ms S in the ICU and also that he would come to review her in PACU
- By this time, it was clear to the PACU nurse that the patient should be in the ICU with constant medical care

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POST ANAESTHETIC CARE UNIT

Background not known by the PACU nurse

- The patient had a large staghorn calculus
- According to an expert witness, studies demonstrate that between 30% and 44% of staghorn stones will be infected stones¹
- Such stones develop when bacteria living within the urinary tract change the urinary pH and allow precipitation of phosphate and several compounds (mainly ammonia and magnesium) resulting in a substance called struvite¹

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POST ANAESTHETIC CARE UNIT

- A number of bacteria can cause struvite stones including Proteus, Klebsiella, Pseudomonas and Staphylococcus aureus¹¹
- There was discrepancy from the initial urology consultation whether the patient actually received a preoperative script for antibiotics
- It was clear when the surgeon and anaesthetist finally saw the patient that the patient was suffering from sepsis (Salient point 10)

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CONCERNS BY THE CORONER

- Availability of an appropriately qualified medical practitioner to review Ms S in PACU whilst the anaesthetist was busy with the next case
- Hospital documentation revealed the use of PACE criteria that listed a number of symptoms or concerns, the final one being 'any concerns that do not fit the criteria'
- The PACU nurse was clearly very concerned about her patient and those concerns fell into the category of 'any concerns that do not fit the criteria'
- She did not think there would be any utility in her calling the ICU: she thought that, to have any effect, a call to the ICU registrar had to come from the anaesthetist despite the stated hospital procedures, and basically because the consultant was still on site, they may feel that the primary carer is still there to make that decision to escalate

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CONCERNS BY THE CORONER

- Other testimony agreed with the nurse, that some doctors are quite finicky ... sometimes they want a doctor to doctor conversation
- The Coroner felt that the PACU nurse was a most impressive witness whose evidence reflected a deep concern for her patient
- The Coroner felt that it is clear that the position she found herself in on the evening was a most difficult one and accepted her evidence, based on her experience, as it grounds the inference that, for practical purposes, any call to the ICU would most effectively have come from the anaesthetist

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CONCERNS BY THE CORONER

- A clinical review should have been undertaken in response to the concerns expressed by the PACU nurse at 20:55 (B/P ↓ 94/x) but certainly by 21:20 (B/P ↓ 81/x) by the anaesthetist

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RECOMMENDATIONS FROM THE CORONER

1. To the Urological Association of Australia and New Zealand: that it give consideration to the need for further guidance to urologists on treatment of large staghorn calculi;
2. To the hospital : that, those organisations incorporate in the proposed Lessons Learned procedure, arising out of the death of Ms S ,
 - i. consideration of problems arising, where a number of consultants are attending a patient, from a lack of clarity as to who has responsibility for ensuring the administration of antibiotics;
 - ii. consideration of methods, including use of stat charts, for ensuring that antibiotics are given promptly upon their being ordered;

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RECOMMENDATIONS FROM THE CORONA

- iii. consideration of, and dissemination of information about, the dilemma, as set out in these findings, facing an experienced and competent PACU nurse in securing a clinical review for a patient about whom she was concerned
That the process address, not only those making the call for clinical review (PACU nurses), but also those receiving the call (anaesthetists/VMOs and members of the Rapid Response Review Team)

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WHAT WOULD YOU DO IN YOUR HOSPITAL IF THIS HAPPENED TO YOU?

Does your hospital have a firm and followed plan of escalation?

- One example of such an escalation plan
- What do we do in PACU when a patient meets the MET criteria?
- There needs to be a clearly discussed & identified escalation process for PACU

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ONE PLAN....

You need to bed a system down in your hospital

One suggestion **FOR THEATRE** (depending on if the situation is urgent or non-urgent)

- **In hours – non-urgent** (non-compromised patient but with observations outside 20% of the patient's normal baseline);
 - call for assistance / urgent medical review/ direction from the treating anaesthetist or their delegate,
 - if the treating anaesthetist is unavailable (for example when they are caring for another patient) speak to the in-charge nurse to assist you to get in contact with the duty anaesthetist (if you have one),

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ONE PLAN....

You need to bed a system down in your hospital

- if an urgent medical review is not obtained within 10 minutes call an external MET call (10 minutes was the time the hospital altered their PACE timeframe to after this adverse event),
- if the patient is becoming compromised, press the emergency bell

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ONE PLAN....
You need to bed a system down in your hospital

- In hours – urgent – (compromised patient);
 - press emergency bell,
 - call a MET call/ code blue if medical assistance is not immediately available.
- In either of these cases call an external MET/ code blue if help cannot be obtained in a timely manner
- In all cases document that the patient had achieved the MET criteria and the action that was taken

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DOCUMENT:

- If an internal call or external MET call was made;
- the time of the call and arrival of assistance,
 - who saw the patient,
 - what action was taken,
 - what was ordered,
 - what was the outcome,
 - future plan of escalation.

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ONE PLAN....
You need to bed a system down in your hospital

Out of hours

- Out of hours non-urgent (non-compromised patient but with observations outside 20% of the patient's normal baseline),
 - when the treating anaesthetist has just left the building, call the duty anaesthetist,
 - If you do not have a duty anaesthetist, call an external MET/code blue.
 - if the patient becomes compromised, press the emergency bell (even if you think no-one is available).

Out of hours urgent – press the emergency Bell, call a code blue!

- What is the plan in your hospital if you do not have a MET/code blue team?

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ONE PLAN....
 You need to bed a system down in your hospital

If after calling for assistance, and the treatment suggested by the treating anaesthetist is at odds with what the nurse believes should occur and the nurse is worried about the patient; (the answer to this question must be discussed within your own unit, the following is one hospital's plan – your hospital will need to make a specific plan)

- In hours, call the duty anaesthetist or director of anaesthesia for a second opinion
- Out of hours call a MET/ code blue

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WHAT DO YOU DO IN THE WARD?

- In deterioration where the patient has reached the Medical Emergency Criteria BUT IS NOT COMPROMISED– Call the Medical Emergency Team (MET)
- If the patient IS COMPROMISED / UNCONSCIOUS CALL A CODE Blue/ Cardiac Arrest team
- What do you do in your hospital if you do not have a Medical Emergency team?

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SALIENT POINT 1

Salient point 1 – respiratory rate (RR) was high (?)
 (propofol & oxycodone)

- Vital signs are the simplest, cheapest and probably the most important information gathered on patients in hospitals²
- We present a large amount of evidence that vital signs are currently poorly valued, not regularly or accurately recorded, and frequently not acted on appropriately²

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RESPIRATORY OBSERVATIONS

Have you ever faked a respiratory observation???

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OLD LITERATURE

- Respiratory observations are the neglected vital sign^{3,4,5}
- Despite the fact that they are a reliable predictor of life threatening clinical adverse events^{3,4,5}

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NEW LITERATURE

- Sadly, in the last ten years, little as altered as RR continues to be the most inaccurately measured and recorded vital sign⁶
- In nearly all stages of clinical deterioration, the respiratory rate has been proved to be salient and arguably the most important observation as it alters before the other observations, thus heralds impending problems⁶

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SALIENT POINT 1

- Alterations in RR's are often early warning signs of conditions that have the potential to go on to cause a cardiac arrest such as;
 - respiratory insufficiency,
 - sepsis,
 - shock,
 - systemic inflammatory response syndrome⁶

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SALIENT POINT 1

- Cited reasons for oversights and error include; lack of understanding of its importance, time constraints, and difficulty in measuring it compared with other vital signs⁶
- Nurses freely admit to rounding up, or guessed RR and studies show that it is taken very poorly (72% measured 18-20 whereas trained observers only found 13% of patients with those values)⁶
- How do you take a respiratory rate? How should you take a respiratory rate?

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**Over one minute!!!
Personally, I use a
stethoscope**

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SALIENT POINT 2

Salient point 2 - The anaesthetist was happy to leave the patient in PACU but was the nurse?

- If we refer to PS04, it states that;
 - 4.4 There must be formal handover of patients by the responsible anaesthetist to PACU practitioners (see PS53 Statement on the Handover Responsibilities of the Anaesthetist)
 - This includes identification of the patient as well as details of the procedure and anaesthesia management.
 - This handover process is only completed once the PACU practitioner has indicated that they are comfortable to continue the ongoing management of the patient without the responsible anaesthetist being physically present (see 8.1.5)⁷
 - IN THE WARD – you are also responsible if you accept a patient from PACU. You have the right NOT to accept a patient!!

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SALIENT POINT 2

Salient point 2 - **IN THE WARD** – as a ward, ICU nurse you are also responsible if you accept a patient from PACU. You have the right NOT to accept a patient!!

Ensure the last set of observations are charted on the ward chart and look at the possibility of this patient already triggering a MET call.

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SALIENT POINT 3

Salient point 3 - Good call to be concerned over 20% of the baseline

- In some nurses' minds, it may be rationalised that it is good that the blood pressure had dropped and that this was now closer to normal limits,
- There is a fundamental flaw in the culture of a 'one-size-fits-all' being able to suit all patient observations and has been accountable for suboptimal care in many adverse events⁸
- Discussion – what are your thoughts?

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SALIENT POINT 4

Salient point 4 – concerns about not passing urine

- Why would you be concerned about this?
 - The nurse cannot check the urine output
 - Also consider a bladder scan if urine retention is a concern but remember this was a urology case

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SALIENT POINT 5

Salient point 5 – patient rewarming and blood pressure

- What are the connections between the vascular compartment and temperature?
 - If you are hot you vasodilate
 - If you are cold you vasoconstrict

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SALIENT POINT 6

Salient point 6 - This is vital, as had this NOT have been recorded the nurse would have forgotten that the call was made.

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SALIENT POINT 7

- Salient point 7 – the nurse did not mention to the anaesthetist that the patient felt cold or that her toes were cold to touch
- This may have been vital information as the patient may have been peripherally shutting down
 - It is not known if the peripheral return was checked in the fingers
 - When B/P is low we must check peripheral return
 - What should peripheral return look like? =
 - **brisk, colour pink, warm finger/toes**
- What is normal B/P
- General consensus would suggest 20% of the patient normal baseline? however THIS MUST NOT EXCEED NORMAL MET CRITEREA LIMITS UNLESS SPECIFIED BY THE TREATING ANAESTHETIST

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SALIENT POINT 7

- S & S of shock**
- Decreased B/P & increased HR
- Position for decreased B/P**
- What to do for decreased B/P
 - Position – flat with feet up
 - O2 therapy
 - ??? B/P – ? manual reading
 - Call for assistance (if the patient is compromised / call for urgent clinical review /MEI/code blue)
 - Check peripheral return
 - Follow instructions from medical staff
 - ??? increase iv fluids, give prescribed medications

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SALIENT POINT 8

Salient point 8 - Well done!

The importance of ECG in PACU¹⁰

Discussion paper

Author:
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ECG for all patients in the PACU: Some say, why? I say, why not?

Abstract

Currently in many Australian hospitals, electrocardiogram (ECG) tests are ordered after the operative period and, despite the evidence base being available in the Post Anaesthesia Care Unit (PACU), they are not connected to all patients.

There are many evidence-based reasons why an ECG used for all patients in the perioperative period is a valuable tool for the detection of other perioperative conditions such as myocardial ischaemia, arrhythmias, electrolyte abnormalities and other conditions that may be associated with the perioperative period.

ECG monitoring also aids in the early detection of myocardial ischaemia, arrhythmias, and the ability for nurses to consistently observe ECG rhythm strips as a warning sign.

The aim of this discussion paper is to challenge health care professionals thinking about the role of ECG monitoring for the entire perioperative journey and to highlight the importance of this patient safety initiative.

Keywords: cardiac monitor, vital signs, monitoring, PACU, perioperative safety, patient.

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SALIENT POINT 9

Salient point 9 - oxygen saturation

- What is the significance of an oxygen saturation of 91%?
- If other variables such as the patient's temperature, acid base were normal, what would the estimated P02 in the blood be?
- =
- 60mmHg
- This is called hypoxia!

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SALIENT POINT 10

Salient point 10 – the patient is suspected of having sepsis

- One wonders if the PACU nurse had knowledge of the risk of infection in this patient (when removing these types of stones), she may have considered sepsis
- Evidence was given by a medical expert that
 - 'the breaking up of the calculi by lithotripsy released materials (endotoxins and cytokines) present in the calculi into the circulation, these released materials having initial adverse effects such as causing inflammation systemically (generally) within the body.
 - the breaking up of the calculi by lithotripsy released Proteus mirabilis organisms into the blood.
 - these circulating Proteus mirabilis organisms caused a generalised (systemic) infection (sepsis or septicemia) that rapidly developed into septic shock
 - the combination of endotoxins/cytokines and Proteus mirabilis infection resulted in the reduction in blood pressure, vasodilation, and other signs of septic shock occurring within the typical 6 hours post organism release into the bloodstream'.
- The cause of Ms's death was multiple organ failure as a result of septic shock.

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Discussion
