"From the Trough"

Perioperative Interest Group Notes

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The imperfect opinions in these reports are only meant to stimulate discussion: - they should not be considered a definitive statement of appropriate standards of care.

TOPIC 1: **Hypothyroidism?**

Female for a cystoscopy, ureteroscopy +/- diathermy to bladder lesions. PMH vascular disease, COPD, smoker, etc. normally on clopidogrel. 18 months ago was noted to be clinically hypothyroid with TSH of 160. TSH is now (on thyroxine replacement) 26, (hence biochemically hypothyroid) but there are no clinical signs of hypothyroidism. Is it appropriate to go ahead?
Discussion: - Although she is not optimised, pragmatically it would be reasonable to go ahead for a relatively low stress procedure such as this. The GP should be notified to increase the dose of thyroxine. The patient may manifest signs of subclinical hypothyroidism intraoperatively (e.g. slow to wake etc.) but from a pragmatic point of view this is a reasonable risk to accept. For major cases modification of management, or postponement for two weeks, may be appropriate.

TOPIC 2: **Prevention of Phantom Limb Pain**

It is an old question:- What is the best management for a patient presenting for planned amputation?
Discussion: - The evidence remains inconclusive. Poor perioperative pain control has been *associated* with increased incidence of phantom pain (Rathmell and Kehlet, Editorial in *Anesthesiology* 2011; 114:1021-4)

From *Acute Pain Management 4th Edition:*
"8.1.5.1 Prevention of phantom limb pain

- Evidence for the benefit of epidural analgesia in the prevention of all phantom limb pain is inconclusive (Halbert 2002 **Level III-2 SR**, 3 studies [epidural], n=106). However, perioperative (pre,intra and postoperative) epidural analgesia reduced the incidence of severe phantom limb pain (NNT 5.8; 95%CI 3.2 to 28.6) (Gehling 2003 **Level III-2 SR**, 9 studies, n=836).
- A small observational study found that the overall incidence of long-term phantom limb pain was similar in patients given IV ketamine (bolus dose followed by an infusion, started prior to skin incision and continued for 72 h postoperatively) compared with no ketamine; however the incidence of severe phantom limb pain was reduced in the ketamine group (Dertwinkel 2002 **Level III-3**); both groups received regional analgesia. Another RCT looking at the effects of IV ketamine reported a numerical, but not statistically significant, difference in the incidence of phantom limb pain at 6 mth after amputation (47% in the ketamine group and 71% in the control group) (Hayes 2004 **Level II**, n=45, JS 4). Perioperative ketamine given by the epidural route showed no preventive effect (Wilson 2008 **Level II**, n=53, JS 5).
- Perioperative gabapentin was ineffective in reducing incidence and severity of phantom limb pain (Nikolajsen 2006 **Level II**, n=46, JS 5).
- Infusions of local anaesthetics via peripheral nerve sheath catheters, usually inserted by the surgeon at the time of amputation, showed no benefit in preventing phantom pain or stump pain (Halbert 2002 **Level III-SR**, 3 studies, n=101; McCormick 2014 **Level I**, 2 RCTs [perineural], n=151)."

The use of continuous nerve block commencing preoperatively with subsequent continuation has not been well studied.

Perineural catheters reduce opioid consumption in first 72 hours post amputation with no associated increase in pain scores (Ayling et al, *European Journal of Endovascular Surgery* 2014; 48:559-64)

Perineural catheters offer the possibility of very effective pain relief after amputation with minimal systemic side-effects in a patient population which often presents with a number of significant co-morbidities. The issue of whether a pre-operatively placed nerve block combined with a post-operative continuous regional anaesthetic reduces the incidence, severity or duration of phantom limb pain has not been adequately studied.

TOPIC 3: Parathyroidectomy under regional anaesthesia?

Comment:- Historically, surgery for excision of parathyroid adenoma has involved extensive neck exploration, often with frozen section, to identify parathyroid adenomas. Regional anaesthesia was therefore not generally considered a feasible option.

Minimally invasive parathyroidectomy has more recently become a standard of surgical care with accurate pre-operative localisation by isotope, CT and ultrasound imaging, enabling much more limited dissection. This has also been made possible by the recognition that hyperparathyroidism is usually the consequence of a single parathyroid adenoma.

More or less simultaneously, Regional anaesthesia for neck surgery has advanced with the development of ultrasound-guided techniques that allow accurate localisation of the superficial and 'intermediate' cervical plexus locations.

The combination of accurate preoperative localisation of parathyroid adenomas, minimally invasive surgical techniques, and reliable cervical plexus blocks under ultrasound imaging may lead to a new paradigm in the management of parathyroid adenoma excision, with regional anaesthesia seen as a much more viable and reasonable option.

See Carling et al "Minimally Invasive Parathyroidectomy Using Cervical Block – Reasons for Conversion to General Anesthesia" *Arch Surg* 2006; 141:401-4

TOPIC 4: Bleomycin Therapy

A 34 year old male has a history of testicular cancer resected 6 months ago followed by Bleomycin therapy. The Bleomycin finished 3 months ago. He now has a lesion (possibly metastatic) in the lung, planned for a VATS thoracoscopic wedge resection. **Question** How should this be managed in context of recent Bleomycin Therapy?

In Summary Unfortunately the evidence wrt Bleomycin and anaesthesia is sparse and old

- Incidence:
  - dependent on bleomycin dose, (and hence type of cancer),
  - FATAL acute pulmonary toxicity post bleomycin <5%
  - onset of clinical symptoms usually subacute between 1-6 months (post bleomycin)
  - evidence of high inspired oxygen provoking or exacerbating pulmonary toxicity several years after treatment is unclear
- The risk of bleomycin-induced lung toxicity is higher in patients who:
  - are older, renal insufficiency (should avoid exposure to bleomycin and attempt alternative)
  - had high-dose bleomycin (>400units- uncommon in germ cell tumour)
  - had concomitant thoracic irradiation and cisplatin at high dose
  - had bleomycin in last 1-2 months
  - smoking (controversial evidence)
- Screening tests:
  - pulmonary function test - DLCO + spirometry (at baseline and intervals during chemo)
  - +/- CXR

- Evidence of high inspired oxygen provoke or exacerbate pulmonary toxicity several years after treatment is anecdotal, based on some animal studies, and a few reports in humans (mainly in patients who had previously developed ALI post bleomycin exposure).
- There is no clear relationship with peak FiO2 and/or duration of oxygen exposure.

- Nonetheless perioperative recommendation are generally:
    - lifelong avoidance of high FiO2 if possible
    - smoking cessation
    - use IV fluids sparingly to avoid pulmonary oedema and fluid overload

Discussion for this case:

Is the surgery necessary based on imaging alone? Discussed with oncologist - the resection is inevitable, performing a CT guided biopsy will not change the need for surgery (whether the histology is fibrosis, chemo-resistant tumour or inflammatory changes)

Pulmonary function tests (esp.DLO2) should be performed to assess any pre-existing lung pathology, and in particular to assess his ability to cope with one lung ventilation.

The Bleomycin effect is partly dosage related and partly related to time since exposure. In more elective surgery PFTs may provide some guidance as to whether to go ahead now or to postpone for some months, but the evidence is equivocal. The general feeling was that surgery should go ahead now.

Consider with surgeon the possibility of performing Video assisted minithoracotomy, if the patient is unable to tolerate complete one lung ventilation

Use intraoperative CPAP to the operative lung (preop discussion with surgeon helps satisfaction)

Particularly during one lung ventilation there should be an acceptance of low oxygen saturation, such as mid 80%. Anaesthesia practice habitually aims for supra-physiological saturation:- particularly in this case, the 'instinctive' desire to have SaO2 of 95% may be dangerous.

As this is so different to usual medical and nursing practice, special attention postoperatively is needed. It would be appropriate to send the patient to HDU, as the limited numbers of staff there may be more likely to understand the need to tolerate a 'low' saturation. (Staff on normal wards may find it difficult to avoid intervening with increased oxygen in the face of a low SaO2).

Use postoperative HDU for high flow nasal prongs (Airvo) with air or very low oxygen concentration) which may also help maintain a saturation by avoiding atelactasis.

Postoperative report

Overall, our young patient went very well on just air intra-op and post-op.

He desaturated quite rapidly to 80s% during the first round of OLV for FOB position check (supine position). We then thought we were going to struggle to keep his saturation up during the surgery with just air. Pleasantly his HPV kicked in really fast the second time around, and his saturation sustained well in low 90s in lateral position throughout the surgery, with only a short duration of low PEEP on air to his operative lung. We sent him to ICU for HFNP on air overnight and he was on room air on the second day.

I was intrigued by his reasonably good oxygenation on subsequent OLV.

- Is it because of the positioning, where blood flow is mainly redistributed to the dependent lung, hence creating less shunting in lateral position?

- Is there really a preconditioning effect to the Hypoxic Pulmonary Vasoconstriction (HPV) reflex, when subsequent OLV has a much more rapid onset of HPV?
- Is HPV onset faster from a low FiO2 lung compared to 100% pre oxygenated lung?
- Does IV Propofol have less effect than inhalational agent in obtunding HPV, and is this clinically significant?

(References for these cases will be added to the PeriopTalk website)