



**Worcestershire
Acute Hospitals**
NHS Trust

Anaesthesia for Major Head & Neck Cancer Surgery with Free Flap Reconstruction

How to survive Mondays in theatre five!

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NOTES TO THE WISE...

Rules of engagement

1. This is a guideline NOT a protocol
2. Timings are approximate
3. The treatment needs tailoring to the individual
4. The body of evidence is a bit sparse and variations in practice exist

BACKGROUND

- The maxillofacial team here provide curative surgery for patients with head and neck tumours
- They are commonly listed as hemiglossectomy, mandibulectomy or resection of floor of the mouth, etc..
- Patients may be coming back for repeat surgery due to recurrence, and beware that they may have had radiotherapy prior to surgery
- The defect created by tumour resection is too big to be covered by skin grafting. A graft that contains soft tissue &/or bone with a blood supply is therefore required

TYPES OF FLAP

SOFT TISSUE

Radial Forearm Free Flap (RFFF)

Anterior Lateral Thigh (ALT)

Popliteal Artery Perforator (PAP)

BONE

Fibula Flap

Deep Circumflex Iliac Artery (DCIA)

Scapula Flap



8:00 PRE-OPERATIVE

- Standard pre-operative assessment, they will have usually undergone CPEX testing prior to listing for surgery
- Thorough airway assessment this should include a review of any previous CT/MRI scans they may have had
- Blood loss will vary depending on the size of resection, unilateral or bilateral neck dissection and type of flap - usually less than 1 Litre but occasionally more.
- Ensure there is an intensive care bed available

NB: Patients used to go to the head and neck ward to be 'specialied' overnight but this is no longer our practice due to the complexity of the grafts

AIRWAY ASSESSMENT

Usual rules apply but also consider

- Tumour location (lateral tongue v base of tongue) (midline versus lateral) (soft palate involvement?) (TMJ involvement?)
- Previous H&N surgery (videolaryngoscope or fiberoptic - some patients may need awake fiberoptic)
- Previous H&N surgery + radiotherapy (We have very low threshold for awake fiberoptic)

FLAP PRINCIPLES

- Traditional teaching about plastics 'flap-cases' warned against the use of inotropes and vasoconstrictors and advocated use of fluids to maintain BP
- In a brief review of literature the populations involved are quite different (plastics cases are usually fitter and can deal with fluids better)
- This patient population usually have comorbidities***. They are often hypertensive on medicines that mean fluids alone don't work and patients then become grossly oedematous
- A working pump and good vascular tone is required in these patients

*** Fun Fact: It's no use having a working flap but a dead brain or perioperative MI!

BP MANAGEMENT

- In these cases we tend to use Metaraminol to raise the MAP and often run it as an infusion (noradrenaline can also be used with caution, phenylephrine doesn't seem to cut the mustard)
- During the resection and flap-elevation some hypotension will help with the surgery and minimise blood loss
- We use the Vigileo/EV1000 cardiac output monitor to control the fluid usage. There is some evidence that hyperhydration results in flap loss
- Dobutamine can be used to maintain cardiac index

HAEMODILUTION

- Haemodilution prior to anastomosis to optimise blood flow, viscosity and thus oxygen delivery is recommended
- We aim for a Hb of 80-100g/dl
- You can use just Hartmann's solution or add in some Isoplex if you feel plasma expansion is required
- We usually end up giving about 2l in the two hours prior to flap insertion

ORDER OF SERVICE

1. Pre-operative assessment
2. WHO Checklist
3. Anaesthetic room
4. Tracheostomy
5. Moving the anaesthetic machine position
6. Tumour resection followed by neck dissection
7. Elevation of flap (often simultaneously with neck dissection)
8. Insertion of flap and microvascular anastomosis
9. Post-operative: Either recovery then ICU as a level 2 or straight to ICU as a level 3
10. Home time

8:30

WHO CHECKLIST

- Introduce yourself to the surgeons....Don't worry if you feel the surgeons are a bit twitchy and appear to be doubting you. They can be a bit possessive anaesthetically
- They like to work with regular people and it takes time to build that working relationship
- Determine which flap is planned and which side (you'll need to use the opposite side for your access, A-line and CVP) they'll often have plan B which may change intraoperatively
- Ask if NG tube is required (some patients will have had a PEG inserted the previous week)
- Check if tracheostomy is going to be required (usually if tumour involves tongue, soft palate, floor of mouth or mandible)
- Decide whether airway is going to be a problem and what gadgets/methods you plan to use

AIRWAY

- As a rule of thumb if they have had previous surgery or radiotherapy or have limited mouth opening we tend to do an awake fiberoptic with some Remifentanyl sedation
- Otherwise CMAC is our gadget of choice

EQUIPMENT

1. Airway
2. NG tube
3. Arterial line (*with Vigileo transducer*)
4. Vigileo/EV1000
5. Remifentanil TCI Pump plus another pump for metaraminol
6. 16G for the foot
7. Ultrasound machine for femoral CVC line
8. Urinary catheter
9. Rectal temperature probe
10. Flotrons (*If not contraindicated*)
11. Antibiotics are required (*usually Co-Amoxiclav every 8 hours*)
12. *Dexamethasone on induction*

ANAESTHETIC ROOM

1. Before commencing anaesthesia take the patients arms out of the gown as it will need to be removed later
2. The patient should lie on a white bed sheet and not the blue transfer sheet
3. Remember which arm & leg not to use for inserting lines
4. Peripheral cannula and induction of anaesthesia
5. Secure airway by method and gadget of your choice***
6. Eyes are protected using chloramphenicol, tapes and pads
7. NG tube if patient doesn't have PEG tube.
8. Arterial line
9. Further IV access (16G in the foot is what we usually use)
10. Femoral CVC line
11. Urinary Catheter
12. Rectal temperature probe
13. Sacral pressure dressing ready to apply once moved onto theatre table to reduce pressure sores

*** Fun Fact: If you can use an ordinary tube and standard laryngoscope for intubation so much the better however there will be situations where other equipment is indicated

Considerations

- Re Femoral CVC
- If the condition of the skin in the groin is poor, then feel to use another site.
- Bear in mind, the neck is in the operative field and do try and avoid a pneumothorax if going subclavian

CONSIDERATIONS

- Neck dissection is done with an unparalysed patient so the surgeons can find the accessory nerve however we find if you use a standard dose of muscle relaxant at induction it covers the CVC line insertion and if you give a second dose when you enter theatre that covers the tracheostomy
- Remifentanil TCI is started at induction and runs throughout
- Iso or Sevoflurane in the anaesthetic room until the end of tracheostomy. Switch to Desflurane once the anaesthetic machine has been moved to the feet end.

Considerations

- Sevoflurane or desflurane?
- It doesn't really matter what you use.
- Des gives a faster wake up but may result in agitation in recovery.
- Agitation is counteracted with the remifentanil infusion continuing on emergence

LOGISTICS

- The anaesthetic machine will initially be positioned at the head end.
- Until the tracheostomy is completed and anaesthetic machine has been moved to the feet end you want as few things as possible connected to make moving the machine easier
- Therefore don't connect the Vigileo, the temperature probe, transducer for CVC or worry about patient warming
- Have all your drips and the catheter at the feet end to start with so these don't need to be moved
- ECG dots should be positioned behind the shoulders. Place some tape over the pads.

9:30

TRACHEOSTOMY

- Usually performed by the registrar (it's how they get practice!)
- Standard anaesthetic management 100% oxygen, deflate cuff when requested, pull tube back as guided by the surgeons
- Turn off the ventilator before connecting the circuit to the tracheostomy tube, confirm ETCO₂ and look at inspired and expired volumes to quantify any leak
- Use the 'AG CUFFILL' &/or the 'Easy Pressure' device to check the cuff pressure is around 30cmH₂O once tracheostomy secured and drapes removed
- Use a fiberoptic scope to check how far the tube is from the carina. You can also suction out any blood / secretions
- Before moving on be 100% sure you are happy with the tracheostomy and if not get the surgeons to check/change it!

TRACHEOSTOMY TIPS

- We have recently changed our practice to insert non-fenestrated tracheostomy tubes which have a subglottic suctioning port. This is because there are cases of surgical emphysema with positive pressure ventilation and fenestrated tubes. The suction port improves the ICU care
- These tubes are made by Portex and have an inner tube that needs to be clicked in, if not clicked in properly you will get approx 100ml leak so if a leak is present get the surgeons to check the inner tube has been clicked in
- Consider the flexible tracheostomy tubes with adjustable flange in obese patients. These also should have an inner tube.

ANAESTHETIC MACHINE

- Once you are happy with the tracheostomy, it is time to move the machine to the feet end
- Turn on the oxygen cylinder on the back of the machine
- Disconnect the anaesthetic machine from the pendants and power
- Move the machine to the pendant at the foot end and reconnect. There is no need to turn it round. It will now be positioned with its back to the patient and surgeons so you can see the machine and them behind it
- Once connected turn off the oxygen cylinder and check you are happy the machine is functioning correctly



NEXT STEPS

Before the next stage of the operation starts you need to...

- Switch to Desflurane/ volatile of your choice....
- Connect up the Vigileo, CVC, Temp probe, Flowtrons and consider moving Remifentanyl/Metaraminol to the CVC
- Connect a syringe of saline with an electrocath infusion line to the central line which can be switched for Noradrenaline or Dobutamine if required
- Apply a whole body bair hugger up to the nipples but don't switch on unless temperature is falling as they tend to warm up
- Put a scrubbing brush under the HME filter on the chest to reduce pressure
- Pass the breathing tubes so they come between the legs and around the left foot to the tube holder to reduce tension on the tracheostomy
- Check all pressure areas

*** Fun Fact: If you have forgotten the sacral pressure dressing you have a second chance to apply it now!!

FINAL CHECKS

The patient is then re-draped for the next steps of the procedure and you will have very little access to so make sure you are confident all your drips and monitors are working well and that you are happy with the tracheostomy before they drape!!

10:30

TUMOUR RESECTION

- Ensure you are now on low flows Air/Oxygen/volatile of your choice, with TCI Remifentanil running
- Head up position
- Some relative hypotension is good here, be guided by the Vigileo for cardiac index and SVV
- They will sometimes ask for a lower BP which can be achieved with the Remifentanil
- Keep an eye on the surgery and blood loss
- You'll often have two teams: one performing the neck dissection and the other raising the flap

TUMOUR RESECTION

- Run Hartmann's as maintenance fluid. Isoplex can be used if you feel plasma expansion is needed.
- Resection can be carnage (depending the size and site of the tumour) so use ABGs to guide your fluids and don't be afraid to use red cells
- There are periods of inactivity with sudden bursts of stimulation so Remifentanil is invaluable
- Once the second team have raised the flap they will leave the vessels connected until they are ready to insert it

14:00

FLAP INSERTION

- You will notice things quietening down now
- Aim Hb 80-100g/dl don't be afraid to transfuse if you've over diluted or Hb has dropped
- To maintain good flow in the flap the patient needs to be a bit hyperdynamic with optimum oxygen delivery
- Maintain a mean of at least 70mmHg (or the normal mean for the patient if usually >70mmHg). The surgeons sometimes ask you to raise it higher than this but they will let you know!
- Vasospasm isn't usually an issue and they can inject papaverine as they are handling the graft
- They might ask for BP elevation to check for bleeding prior to closure
- There might be a 'haemostatic pause' for 15 minutes or so before they come back and close

17:00

NECK CLOSURE

- Once they are happy with blood flow in the flap and haemostasis they will close the neck
- Keep an eye on things with regular ABGs (we tend to do two hourly samples)
- At the end of the procedure rationalise any lines/infusions
- Check the trache tube position again with the fiberoptic scope
- Remifentanyl can continue to recovery and intensive care but it's best to convert to ml/hr before going to ITU

POST-OPERATIVE

- Never underestimate the physiological beating that has just occurred
- If things have gone to plan and surgery has finished at a reasonable time (Before 19:00) then they should be able to be woken and taken to recovery
- Some agitation is to be expected as they wake up following a long surgery with tracheostomy in situ, we have found that Remifentanyl is very useful for this and can be titrated. Some patients will have to go back to sleep using a Propofol infusion.
- Post-operative pain isn't usually an issue as the nerves to the flap have been disconnected. The site where the flap has been raised from is usually more painful but this depends on the patient and the site (DCIA and Scapular flaps are usually the most painful)
- On average 15mg Morphine should be enough prior to waking them up.

INTENSIVE CARE

- If the operation has not been straight forward or there have been issues with the flap anastomosis then the operation can continue well into the evening (Bone flaps take longer anyway!)
- If this is the case it is safer to transfer the patient straight to intensive care and keep them sedated on Propofol and Remifentanil overnight and wake up in the morning
- If the patient is not suitable to be woken up due to their co-morbidities then transfer to intensive care as a level three

POST-OPERATIVE GOALS

- Maxillofacial team use a Doppler (inserted at the time of anastomosis) to monitor the flow
- Aim MAP > 70 mmHg
- Ensure normothermia
- May need to continue Metaraminol / Noradrenaline to counteract the effect of sedation
- Keep head-up
- CXR for NG-tube position and post tracheostomy

A WORD ON SCAPULA FLAPS...

- Scapular resection can't take place during neck dissection so happens afterwards. The head is wrapped up and the patient turned laterally
- Expect more and continued blood loss (resection site open)
- The blood loss is often hidden in the drapes and on the floor and by the wash used. The scapular flap is elevated and the bits resected
- Mind your monitors in the turn. Be careful with the tracheostomy.
- Turn the patient back supine
- We used to insert epidural catheters into the wound and run bupivacaine infusions however there is not a protocol for this and it is therefore best avoided

*** Fun Fact: You can expect large blood loss up to 4 litres and big fluid shifts. It can be carnage especially with bilateral neck dissection and bony resection.