Local and Regional Anaesthesia

Dr Matthew Griffiths
June 2009
OUTLINE

- Common sense division of blocks.
- Choosing appropriate techniques for your institution.
- Neuroaxial opiates and neuroaxial risks
- Infiltration anaesthesia
- Common Head and neck blocks
- Fascia iliaca block
- Ankle and foot blocks
- Ilioinguinal and TAP blocks.
- Ultrasound “the new revolution”
- Useful Resources.
COMMON SENSE

• Divide regional anaesthesia into 3 sections
  ❯ Core blocks/techniques that everyone should be able to do.
  ❯ Intermediate blocks that with repetition and training you will develop into your practice.
  ❯ Advanced blocks that unless you are performing regularly you just shouldn’t be doing.
CORE BLOCKS

- Infiltration anaesthesia.
- Most head and neck blocks.
- Axillary, arm and hand blocks.
- Ilioinguinal/iliohypogastric blocks.
- Femoral, fascia iliaca, sciatic blocks.
- Ankle and foot blocks.
INTERMEDIATE BLOCKS

- More technically difficult blocks, with greater risk of both failure and complications.

- Blocks that you develop in your practice generally because of the type of lists that you do.

- All still relatively easy to master with a bit of study and repetition. Becoming easier with ultrasound
  - Upper brachial plexus blocks (interscalene, supraclavicular, infraclavicular) shoulder and arm lists.
  - Lumbar epidurals and spinals (obstetrics, orthopaedics).
  - Eye blocks (ophthalmology).
  - Lumbar plexus blocks orthopaedics.
  - TAP Blocks (abdominal surgery).
  - Nerve catheter infusions (orthopaedics)
ADVANCED BLOCKS

- Highly technically difficult.
- High risk of failure and complications.
- If you have a complication and are only doing one a year you probably will get hammered from a medico legal perspective.
- Loose your feel for if your not doing them.
  - Thoracic epidurals.
  - Deep cervical plexus blocks.
  - Most chronic pain blocks (eg coeliac plexus, facet joints, etc)
  - Intrathecal opiates.
CHOOSING APPROPRIATE TECHNIQUES FOR YOUR INSTITUTION

- The best block and technique is only as good as the post operative care that the patient gets.

- Need to use techniques that the wards understand and can manage.

- No point placing an epidural if the wards cannot manage the epidural infusion appropriately.

- This will alter from place to place and even from campus to campus. Eg POW and the Womens hospital.

- This should NOT mean you can’t decide to teach and train your staff if it is something you are willing to put the time in.
NEUROAXIAL OPIATES

- The three common agents used are
  - Fentanyl (100mcg epidural 10-20 mcg spinal).
  - Pethidine (mainly epidural 50mg).
  - Morphine (1-3mg epidural 100-400mcg spinal)

- Well accepted and common practice to use fentanyl with local anaesthetic in epidurals and spinals, particularly in obstetrics.

- Morphine is an agent that frequently is used both in obstetrics, orthopedics and major abdominal surgery.

- It tends to be a bit institution popular and in most of those institutions there are well designed protocols for the usage
NEUROAXIAL MORPHINE

- What can we definitely say about it compared with PCA

- Benefit and risk of intrathecal morphine without local anaesthetic in patients undergoing major surgery a meta-analysis of randomized trials (BJA March 2009)

  - Pain scores are better (usually 1-2cm on the VAS) for 24 hours.

  - Opiate sparing for 48 hours.

  - Increased nausea, vomiting and pruritis.

  - Increased risk of late respiratory depression odds ratio (OR) 7.86 (95% CI 1.54-40.3)
Clinicians who wish to continue to use intrathecal morphine should consider that the optimal dose (i.e. the dose that has adequate analgesic efficacy without causing life threatening respiratory depression) remains unknown, as does method and adequate length of monitoring of respiratory function. In view of all these caveats, the most radical, and perhaps most appropriate, conclusion would be that this analgesic intervention that reduces postoperative morphine consumption but not morphine-related adverse effects, that only slightly improves postoperative pain intensity, that significantly increases the risk of pruritus, and that is associated with a finite risk of respiratory depression should be abandoned “.
WHAT DO I RECKON

- What would I consider using it for
  - Spinal C-sections
  - Total knee surgery
  - Major abdominal surgery egwhipples, AAA

- How much would I use.
  - 100mcg spinal
  - 1-2mg epidural

- Post operative analgesia
  - PCA morphine 0.5-1mg boluses 10min lockout.
  - Regular paracetamol +/- NSAID's

- Post op monitoring caveats
  - HDU/ICU 48 hours
  - Pulse oximetry for 24 hours. * Resp depression unlikely after 72 hours.
INFLTRATION ANAESTHESIA

- NOT DEAD SEXY BUT EFFECTIVE !!.

- If you can cover the area adequately with infiltration it is as effective (if not more) as any nerve block.

- Arguably more reliable.

- Simpler.

- Agent of Choice Ropivacaine (Naropin)

- Dose 3mg /kg up to 200mg single dose.

- Dilutions down to about 0.5% provide adequate surgical anaesthesia and doses down to 0.375% give good post operative analgesia.
INfiltration Anaesthesia

- Why Ropivacaine??
  - Less cardiac toxicity than Bupivocaine.
  - Longer duration of action.
  - I regularly get 18 hours.

- Vasoconstriction.
  - At lower doses it has vasoconstrictive properties in its own right at higher doses vasodilation occurs.
  - If you surgeon wants greater vasoconstrictive actions then simply add adrenaline.
  - 1mL 1/10,000 to 20ml naropin = 1/200,000.
  - 2ml = 1/100,000.
HEAD AND NECK BLOCKS

- Supra-orbital and supra trochlear blocks.
- Infra-orbital block.
- Mental nerve block.
- Ear block
- Superficial cervical Plexus block
SUPRA-ORBITAL AND TROCHLEAR BLOCK

Area of anesthesia

Supraorbital n.

Supratrochlear n.
SUPRA-ORBITAL AND TROCHLEAR BLOCK

- Generally done in combination for operations on front of scalp.
- Supra orbital nerve leaves the supraorbital notch at the midpupillary line (easily palpable) and the trochlear is approximately 1.5cm medial to this.
- Subcutaneous injection stating just lateral to the supra orbital notch and extend medially to the midline of the nose.
- Use about 5ml 1% Naropin.
- If the lesion you are operating on is close to the midline do bilateral blocks, because there is often a lot of cross over innervation at the midline (this goes for almost all midline structures).
- Try not to stray too far down the eye lid as you can get a haematoma.
- Don’t splash naropin in the eyes.
INFRA ORBITAL BLOCK

- Infraorbital n.
- Area of anesthesia
INFRA ORBITAL BLOCK

- Located midpupillary line along the infra-orbital ridge.
- Easily palpable.
- Approach can be cutaneous or mucosal.
- Cutaneous insert 25g needle down to the periosteum and deposit 1-2 ml 1% Naropin either side of the nerve.
INFRA ORBITAL BLOCK

- Mucosal approach, use topical anaesthesia to the mucosa (lignocaine spray, 4% liquid even xylocaine viscous).

- Insertion point is at the height of the mucobuccal fold at the second bicuspid and angle towards the infraorbital notch.

- When bone is contacted deposit 1-2 ml Naropin 1%.
MENTAL NERVE BLOCK

Area of anesthesia

Mental n.
MENTAL NERVE BLOCK

- Mental foramen is again located midpupillary line along the mandible.

- Approach may be cutaneous or mucosal.

- Cutaneous approach palpate the formen and insert a 25g needle to the periosteum to one side of the foramen. Inject 1-2 ml 1% Naropin either side of the nerve.

- Mucosal apply topical anaesthesia to the mucosa and insert in the inferior labial sulcus at the apex of the 1st bicuspidx. When at the foramen inject 1-2ml either side of the nerve.
EAR BLOCK

• You can do almost everything this this block (and I have).

• Sounds fancy blocking the auriculotemporal, greater auricular, lesser occipital and auditory branches of the vagus.

• BUT IT JUST A RING BLOCK

• Depending on the size of the ear you will need 20-30ml local anaesthetic.

• Usually dilute 20ml of 1% Naropin to 30ml or 0.75% if small person
EAR BLOCK

Auriculotemporal n.

Lesser occipital n.

Vagus n.

Great auricular n.
SUPERFICIAL CERVICAL PLEXUS

● Good block for superficial neck surgery.
  ● Lumps and bumps.
  ● Lymph node biopsies.
  ● Even when taking skin for a skin graft.

● Nerves are lesser occipital, greater auricular, transverse cervical and supraclavicular.

● Start at the midpoint of the posterior border of sternocleidomastoid. This is where the nerves emerge. A 22 gage cannula needle works well.

● Insert till you feel a pop through the cervical fascia.

● Some books say it is purely subcutaneous, but you need to be below the fascia for a good block.

● Use 5ml 1% Naropin.

● Then run the needle cranially along the border of SCM infiltrating a further 5ml then repeat the process caudally.
SUPERFICIAL CERVICAL PLEXUS
FASCIA ILIACA BLOCK

- Simple and effective block to perform instead of a femoral nerve or Triple block.

- Personally find it more reliably gets the lateral femoral cutaneous and obturator nerve.

- If not being done with an ultrasound it is much safer than a femoral block in terms of vascular or nerve damage.

- Uses
  - Fractures neck of femur.
  - Fractured shaft of femur (STUNNING BLOCK).
  - Any upper leg surgery.
  - In combination with sciatic block for knee surgery.
FASCIA ILIACA BLOCK

- Insertion point draw a line from the ASIS to the pubic tuberule.
- Divide this into 3rds.
- At the outer 1/3 come down 2cm and insert the needle through the skin.
- Then insert till 2 pops are felt. You are now under the iliac fascia.
- Flatten the needle out and advance about 1-2cm.
- Inject 20ml 1% Naropin that you have diluted to 30ml.
- When injecting place some pressure on the leg distal the the needle insertion (this aids spread).
- If doing it for a NOF save yourself 5ml of the local and place a subcutaneous sausage of local alone the iliac crest to block the subcostal nerves that supply part of the lateral portion of the upper leg (ie part of the NOF incision). Iliac Crest Block
- If you want to place a catheter you can do the same with an epidural catheter set.
FASCIA ILIACA BLOCK

Os pubis

Spina iliaca ant. sup.

Puncture site
FASCIA ILIACA BLOCK

FL
FS
FN
FA
FV
IPM
PECT
FI
usra.ca
FASCIA ILIACA BLOCK

- Simple
- Cheap
- Low tech
- Effective
- Well away from the nerve and vessel some you can't hit it.
ILIA CREST BLOCK

Subcutaneous sausage
Along the iliac crest
ANKLE BLOCKS

- Very useful
- Save my bacon on many occasions for the grotty not fit for a “hair cut“ type patients at 2am in the morning.
- Need about 25mls of local (generally dilute about 20ml naropin 1% to 25mls).
- Most commonly we do them as a virtually a ring block but you can do them individually
- The nerves blocked are
  - Posterior tibial.
  - Saphenous
  - Sural
  - Deep peroneal
  - Superficial peroneal.
ANKLE BLOCK DISTRIBUTION

Fig 1
- Saphenous nerve - femoral nerve
- Deep peroneal nerve
- Superficial peroneal nerve

Fig 2
- Sural nerve
- Medial plantar nerve
- Lateral plantar nerve
- Post tibial nerve
ANKLE BLOCK TECHNIQUE

- **Posterior Tibial**
  - This is the only one that is a deeper block.
  - Find the posterior tibial artery pulsation and insert the needle posterior to this.
  - You often feel a pop as you pass deep enough.
  - You can use a nerve stimulator and you get some toe plantar flexion.
  - Inject 5-7ml local anaesthetic

- **Sural Nerve**
  - The mirror to the tibial nerve.
  - Inject a sausage of local anaesthetic between the lateral malleolus and the achilles tendon
ANKLE BLOCK TECHNIQUE

Fig 4
ANKLE BLOCK TECHNIQUE

- Deep peroneal Nerve
  - Palpate the dorsalis pedis pulse.
  - Insert a needle just medial to this.
  - If bone is struck come back fractionally.
  - Inject 2-3 mls of local anaesthetic.

- Superficial peroneal nerve and saphenous
  - Starting just in front of the medial malleolus extend a subcutaneous sausage of local anaesthetic to the lateral malleolus of the foot.
  - About 10ml
TRADITIONAL ILIOINGUINAL / HYPOGASTRIC BLOCK

- Excellent block for hernia repairs.
- If used bilaterally good for infra umbilical incisions.
- Becoming superceded by TAP block with ultrasound.
TECHNIQUE

● The landmark is the ASIS.

● Come 2cm medial and inferior.

● Insert a blunt needle through the skin and advance further until a pop is felt, you have now passed through external oblique and in this plane the iliohypogastric nerve lies inject 7 ml 0.75% naropin.

● Advance a further 1-2 cm till another pop is felt you are now through internal oblique, in this layer the ilioinguinal nerve lies. Inject 3 ml 0.75% naropin.

● If I am doing an inguinal hernia I usually go on to do the genitofemoral nerve and let the surgeon infiltrate his incision line with 20mls 0.2% naropin.
GENITOFEMORAL NERVE BLOCK

- Midpoint of the inguinal ligament.
- Come approximately 1-2cm cranially.
- Insert a blunt needle through the skin and advance until a pop is felt, you generally only get one good pop rather than the 2 for the ilioinguinal block.
- Inject 7 mls of local anaesthetic.
- You are actually blocking this in the inguinal canal
TAP BLOCK

- Transversusabdominis block.
- The archetypal ultrasound block.
- Simple to do.
- Best uses are for infra umbilical incisions but can be used for all abdominial incisions with variable success.
- Unilaterally can be used for hemia and appendix operations.
- Bilaterally for urological, O and G and laparotomy.
- Really a lecture in itself.
TAP BLOCK

- The original description describes a way to block T10-L1 with great effect.

- More recent attempts that involve a more lateral and cranial have been used for
  - Open cholecystectomy.
  - Laparoscopic cholecystectomy.
  - Laparotomies
TAP BLOCK

- The point of entry for the blind TAP block is the lumbar triangle of Petit.

- This is situated between the lower costal margin and iliac crest. It is bound anteriorly by the external oblique muscle and posteriorly by the latissimus dorsi.

- This technique relies on feeling double pops as the needle traverses the external oblique and internal oblique muscles.

- A blunt needle will make the loss of resistance more appreciable.
TAP BLOCK

- More recently the ultrasound has been used for these blocks which allow for a more accurate placement of local anaesthetic.
- Landmarks are much the same as for the blind technique.
- Usually midaxillary line.
- Place the probe on the abdomen and identify the layers.
TAP BLOCK
TAP BLOCK

- Insert your needle in-plane with the probe (so you get a good picture of the needle) until you reach the space between internal oblique and transversusabdominus.

- Deposit 20ml of local anaesthetic into the space.

- Watch the anaesthetic spread.

- If for a laparotomy also do a second subcostal injection just lateral to the rectus abdominus muscle.
TAP BLOCK
SUBCOSTAL TAP BLOCK
ULTRASOUND

- The new toy.
- Practice dependant, ie you need to use it to get better at it.
- You need one or you won’t get better at it.
- Eventually they will become a standard of care.

- What can we definitely say
  - Lower failure rate.
  - Faster onset time.
  - Faster to perform (once proficient).
  - Longer duration of action

- Ultrasound guidance compared with electrical neurostimulation for peripheral nerve block: a systematic review and meta-analysis of randomized controlled trials BJA January 2009.

- Probably decreases complications (unlikely to prove).
BICARBONATE

- Does make injection less painful (I tried it yesterday).
- Precipitates bupivacaine and ropivacaine.
RESOURCES

- THE Astra Zeneca Rep

- NYSORA (New York Society of Regional Anaesthesia)
  - Excellent web site
  - Excellent book
  - Nysora.com.au

- ASURA (Australian Symposium of Ultrasound guided Regional Anaesthesia)
  - Excellent book
  - www.asura2009.anaesthesia.org.au
  - 21-23 November

- College Conferences and courses.
  - 3rd Annual Sydney Ultrasound Regional Anaesthesia Symposium, 01 August, 2009
  - AstraZeneca Conference Centre. 66 Talavera Road, North Ryde.
  - Time: Download Flyer & Registration Form: at www.heartweb.com.au

- www.usra.ca Canadian US group

- www.esraeuropa.org European society of regional anaesthesia