

# The Newcastle upon Tyne Hospitals NHS Foundation Trust

## Guideline for perioperative use of continuous interscalene catheter

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Ratified By:	Dr Nicola Ledingham, Consultant Anaesthetist

### 1 Aim / purpose of this guideline:

The purpose of this guideline is to provide information about the technique and management of continuous interscalene catheters. In our trust we use interscalene continuous infusions widely for major and intermediate shoulder surgeries. Some of them are done as day case ambulatory procedures.

### 2 Evidence / key points for perioperative use of the interscalene catheters:

- Shoulder surgery is associated with moderate to severe pain and good analgesia is very important for functional recovery of the patients and for early discharge. (Chelly at, 2010; Christina L et al, 2008; Fredrickson M, 2010).
- Prospective randomised study comparing continuous interscalene and continuous subacromial infusion for arthroscopic rotator cuff repair, showed better analgesia in the interscalene group. (Kolta et al, 2008)
- There are various approaches for interscalene catheters, namely anterior, anterolateral and posterior (NYSORA). The use of ultrasound has been shown to be associated with improved success rate and less number of needle passes. For shoulder surgery it is really important the catheter is placed near C5/6 root (superior trunk) and use of ultrasound facilitates this. In a randomised controlled study comparing catheter placement with ultrasound and neuro stimulation showed the former is associated with improved success. (Fredrickson et al, 2009)
- Patients can be discharged safely with the disposable elastomeric pump for continuous analgesia. (Klein et al, 2000; Agreda G et al, 2007).

### 3 Procedure

#### 3.1 Indications

Any surgery on the shoulder, lateral end of clavicle, acromioclavicular joint, proximal humerus and elbow. The strong indications are total shoulder replacement and rotator cuff repair. Other indications are arthroscopic subacromial decompression, excision of lateral clavicle (Mumford procedure), arthroscopic stabilisation including SLAP lesion, labial tears.

#### 3.2 Contra indications

Patient refusal and infection at the local site are the absolute contra indications. The relative contra indications are contra lateral phrenic nerve palsy, pneumonectomy, severe COPD and coagulopathy.

### **3.3 Anatomical considerations**

Brachial plexus that supplies the upper limb is formed from the anterior primary rami of lower 4 cervical and 1<sup>st</sup> thoracic spinal nerves. The components of the plexus include roots, trunks, divisions, cords and the terminal branches. The interscalene approach to the brachial plexus is at the level of the roots / trunk at the level of cricoid cartilage corresponding to the C6/7 vertebra where the roots are wedged between the scalene muscles. These appear as hypoechoic structures between the scalene muscles. The catheter placement for the shoulder surgery is aimed at the level of c5/6 which is achieved by the anterolateral approach.

### **3.4 Preoperative assessment and consent:**

The patients planned for the elective orthopaedic procedures are pre-assessed few weeks before the procedure and information leaflets are given about the interscalene nerve catheters. The anaesthetist performing the block must ensure the patient receives full information about the procedure side effects, potential complications and how to take care of the blocked arm.

### **3.5 Set Up:**

- High resolution (10-15Hz) linear probe
- Sonolong Echo facet tip 50mm 19 G needle and catheter kit
- Medical cyanoacrylate (e.g. dermabond)
- Catheter anchoring device (lockit)
- Tincture benzoin
- Clear dressing
- Others - drapes, sterile gloves, gown and chlorhexidine 0.5%

### **3.6 Technique**

- Patient is checked and consent is verified. Standard monitoring is commenced and intravenous access is obtained.
- Position the patient supine or semi sitting with head facing away from the side to be blocked. It is often easier to perform the procedure standing behind the patient at the head end. It is important all equipment is prepared in advance as any small movement will easily dislodge the needle.
- STOP before block is performed.
- The scanning technique is a trace back technique from distal to proximal.
- The needle insertion may be in-plane or out of plane. In the in plane technique, it is important to visualise the whole length of the needle when advancing. The out of plane technique is preferred for the placement of nerve catheter.
- The needle is advanced by hydro dissection with 0.5–1ml of local anaesthetic to open the fascial plane. The local anaesthetic should spread anterior and posterior to the nerve structures and surround them as doughnut shaped hypo echoic areas. Inject up to 10ml of local anaesthetic to distend the interscalene groove to facilitate advancement of catheter.

- The catheter is advanced at least 3 - 5cm beyond the tip of needle and the needle is carefully withdrawn as the catheter can easily dislodge being superficial.
- Dermabond is applied to the skin entry site to aid secure the catheter and minimise LA leakage. Application of tincture to 2 cm radius of skin around the puncture site improves the Lockit skin adhesion. Secure with Lockit fixation device and apply the dressing over it.

### 3.7 Side effects

- Ipsilateral hemi diaphragm paresis
- Hoarseness of voice secondary to involvement of recurrent laryngeal nerve
- Horner's syndrome

### 3.8 Complications

- Central neuraxial blockade
- Injection into vertebral artery
- Intraneural injection and permanent nerve damage,
- Pneumothorax
- Bleeding and infection
- Local anaesthetic systemic toxicity.

### 3.9 Setting up the infusion and the local anaesthetic regimen

- We use Easypump C-bloc which is a portable elastomeric pump with capacity of 400ml.
- The rate of infusion is usually set as 4-6 ml/hr. The local anaesthetic used is 0.25% levobupivacaine.
- The infusion is clearly prescribed in the nerve catheter chart for the ward and details should be entered in the nerve catheter database..
- The anaesthetic nurse fills the pump and checks with the anaesthetist in charge of the block before starting the infusion. The pump usually lasts for 72 – 96 hours depending on the rate of infusion.
- **Warning:** These pumps have no alarms or indicators to suggest that they are empty.

## 4 Monitoring and management in the ward

- The patients are monitored every 15 minutes in recovery, hourly for 4 hours in the ward and then 4 hourly after until the infusion is discontinued.
- The HR, Respiratory rate, BP, sedation score using a sedation scale 0- 3, pains score using the standard numerical scale (0- 10) are recorded hourly for 4 hours and then 4 hourly until the infusion is discontinued. Any signs of local anaesthetic toxicity are also looked for regularly and similarly recorded in the observation chart. The catheter site is checked regularly for any signs of leakage.

- Patients with continuous interscalene catheters are monitored by the qualified nurses in the ward who have had training in looking after patients with peripheral nerve block catheters.
- The acute pain team review the patients daily until the infusions are discontinued or the patient is discharged.
- Acute pain team or (PINC) anaesthetist on call during out of hours to be contacted if there is any problem e.g. pain scores > 4, dense motor blockade or reduced hand and finger function.
- **Top up:** Bolus of the interscalene catheter can be performed in the ward. It can only be done by the anaesthetist with experience in continuous interscalene technique or Acute Pain nurse. Patients are monitored for at least 30 minutes after the top up for any signs of toxicity and efficacy of block.

## 5 Discharging patients

- Some procedures are done as day case and patients can be discharged home with interscalene catheter provided they have understood the information and have somebody to care for them at home.
- Clear written instructions are given regarding breakthrough pain, limb protection, catheter site care, fluid leakage and when to contact hospital.
- The patients must also receive prescription for regular analgesics and oral opioids (Oramorph 10mg 4hourly as required for up to 72 hours) to take for breakthrough pain.
- The Orthopaedic sister visits the patients daily to review the patient for pain control, any symptoms of catheter migration, local anaesthetic toxicity and records them.

## 6 Discontinuing and removal of the catheter:

The infusions are continued for 3-5 days depending on the severity of pain and the procedure. The catheter can be removed by the nursing staff in the ward or by the Orthopaedic sister who visits the patients who are discharged home. They must ensure the tip of catheter is seen after removal.

## 7 Roles and Responsibilities:

- 7.1 Regional Anaesthesia Lead:** Accountable to the trust board to ensure compliance with the protocol in anaesthetic and surgical service.
- 7.2 Anaesthetic consultant** performing the procedure is responsible for discussing the use of technique with surgeon prior to the surgery, ensuring patient has received full explanation about the procedure including the benefits, side effects and potential **complications** and finally to prescribe clearly and connecting to the patient, informing acute pain team and making sure adequate staff are available to care for the patient in the ward.
- 7.3 Pain management team** for monitoring these patients by ensuring the staff are compliant with the policy and offering support and training to the staff in the wards which care patient with peripheral nerve catheters.

- 7.4 Orthopaedic sister** is responsible for reviewing the patients who undergo day case procedures with continuous nerve catheters.
- 7.5 Pharmacy** for stocking the Local anaesthetic solutions and ensuring the storage of these separate from the iv fluids.
- 7.6 Wards**, for making sure the staff are familiar with the policy and regularly checking the stock of intralipid.

## **8 References**

1. Continuous peripheral nerve blocks in acute pain management, J.E Chelly et al. BJA 2010, Volume 105, issue suppl 1, 186-196.
2. Interscalene brachial plexus block with a continuous catheter insertion system and a disposable infusion pump, Klein et al. Anaes and analg 2000, Vol 91, issue 6, 1473-1478.
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5. Anaesthesia for shoulder surgery, Christina L et al, Contin Educ Anaesth Crit care and pain 2008, Vol 8, issue 6, 193-198.
6. Analgesic effectiveness of continuous versus single injection interscalene block for minor arthroscopic shoulder surgery, Friedrichson Michell, RAPM 2010 35(1), 28- 33.
7. Continuous interscalene block at home: why not? Agreda G et al, RAPM 2007 ,32(5); 55.
8. Prospective comparison of ultrasound guidance vs neuromodulation for interscalene catheter placement, Fredrickson et al, RAPM 2009; 34(6), 590-594.

Authors: Dr Kavitha Manoharan, Dr Mritunjay Varma

## Appendices

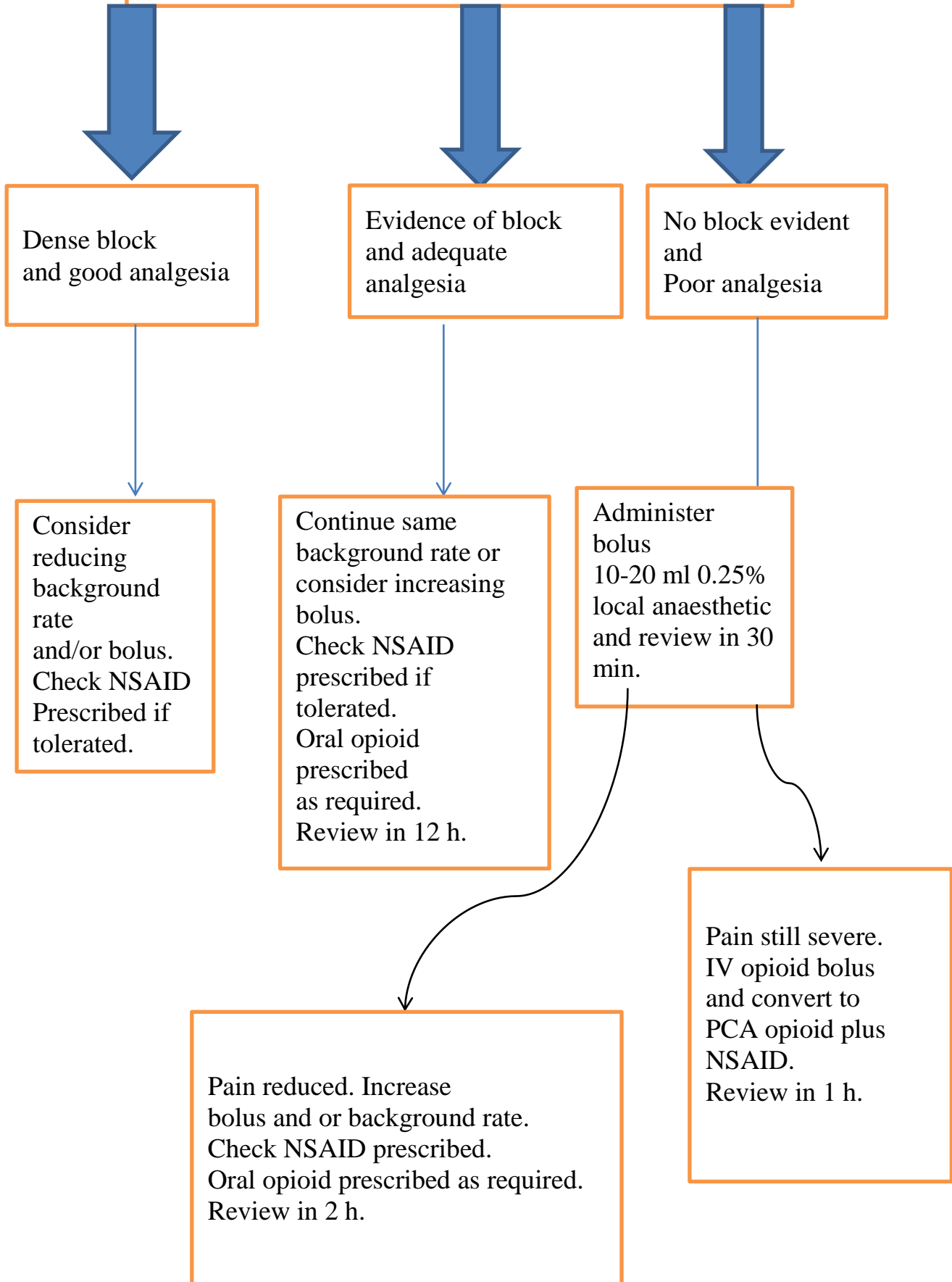
### 1. Considerations in patients on anti-platelets and anticoagulants therapy:

- 1.1 Spontaneous hematomas have been reported in patients who took anticoagulants. The hematomas occurred in patients with abnormal and normal coagulation status, and in patients who were given LMWH, ticlopidine and clopidogrel, warfarin, heparin, or a combination of the drugs. **(NYSORA)**
- 1.2 **AAGBI recommendations on Regional anaesthesia and patients with abnormalities of coagulation:** The risk of hematoma is highest with neuraxial blockade and the single shot interscalene falls in the middle, with catheter technique carrying slightly more risk than single shot. The same principle should apply whilst removing the catheter.
- 1.3 If peripheral nerve blocks are performed in the presence of anticoagulants, the anaesthetist must discuss the risks and benefits of the block with the patient and the surgeon, and follow the patient very closely after the block.

### 2. Nursing guidelines for Troubleshooting:

- 2.1 **Inadequate analgesia:** If pain score >7 on any one occasion and >4 or more on two occasions or more, contact the acute pain team or PINC anaesthetist out of hours.

**Post operative assessment for interscalene catheter**



## **2.2 Any signs of Local anaesthetic toxicity:**

Look for signs of LA toxicity: any metallic taste, tingling of fingers and tongue, agitation, decreased conscious level, hypotension, convulsions, apnoea, arrhythmias and cardiac arrest.

Management includes stop the infusion, administer 100% oxygen and call PINC anaesthetist and in the event of cardiac arrest follow standard ALS/ BLS protocol.

## **2.3 Leakage or occlusion of the catheter:**

If there is slight leak and the patient remains comfortable continue with the infusion and observe the catheter site. If patient is in pain and the leakage continues contact the pain team immediately for alternate pain relief.

For occlusion, again check for any obvious kink in the catheter and the connections and if it persists or patient having pain contact the acute pain team or PINC anaesthetist out of hours.

## **3 Management of local anaesthetic systemic toxicity:**

**Follow the AAGBI safety guideline 2010**

[https://www.aagbi.org/sites/default/files/la\\_toxicity\\_2010\\_0.pdf](https://www.aagbi.org/sites/default/files/la_toxicity_2010_0.pdf)