Continuous paravertebral block in the outpatient setting following VATS lobectomy:

A pilot study

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Overview

- Background
- Objectives
- Study design
- Implications
Background

- Lung resection surgery
  - Thoracotomy
  - Video-assisted thoracoscopic surgery (VATS)
Thoracotomy

- Associated w/ significant postop pain
  - T2 -> T8 dermatomes

1 Gottschalk et al. 2006
TEA in Thoracotony

- Thoracic epidural analgesia (TEA) often cited as the “gold standard”
PVB vs TEA in thoracotomy

- Comparable analgesia
- PVB has lower rates of complications
- May be associated with shorter LOS

\( ^2 \) Joshi et al. 2008
\( ^3 \) Davies et al. 2006
\( ^4 \) Elsayed et al. 2012
Paravertebral block

- Paravertebral space
- Sympathetic chain
- Epidural space
- Parietal / visceral pleura
- Ventra rami
- Dorsal ramus

modified from USRA
Analgesia in VATS?

- PVB - feasible alternative to TEA for open thoracotomy

- Evidence is less clear for VATS
  - Ideal analgesia = ???

5 Daly et al. 2009
6 Hotta et al. 2011
7 Nagahiro et al. 2001
Continuous Peripheral Nerve Block

- Insertion of an infusion catheter at the peripheral nerve innervating the surgical area
CPNB

- Can be discharged home with catheters in-situ and portable infusion pumps
CPNB - benefits

- better pain control
- lower oral opioid requirement
- improved quality of sleep
- better patient satisfactions

8,9 Ilfeld 2005, 2011
CPNB – is it safe?

- Safety data of upper + lower limb blocks for orthopedic surgery

- Complications
  - Infection (<1%)
  - Falls (1.7%)
  - Neurological deficit (0.3 - 2%)
  - LA toxicity (???)

10 Swenson et al 2006
11 Swenson et al 2010
PVB + CPNB?

- Safe for ambulatory breast cancer surgery
  - Only 2 / 52 with ropivicaine infusion via PVB developed transient neurological symptoms

12 Buckenmaier CC3rd et al 2010
PVB + CPNB?

- However, to our knowledge…

- No study addressed the use of outpatient PVB in patients following VATS lobectomy
Objectives

To determine whether…

1) PVB ≥ TEA / PCA for analgesia

2) Outpatient PVB = “safe” & feasible

3) Outpatient PVB = better patient outcome

…following VATS lobectomy
Study design

- a prospective, randomized controlled study
**Inclusion Criteria**
- Age 18 – 80 y.o.

**Exclusion Criteria**
- CAD (NYHA > 3)
- Liver disease (Child-Pugh > B)
- Renal disease (Cr > 150)
- ASA ≥ 4
- Deem dangerous by staff
- Coagulopathy
- On anticoagulants/platelet
- LA allergy
- OSA
- Pregnancy
- Morbid obesity
- Hx of substance abuse
- Conversion to thoracotomy
- Prev thoracic procedures

**VATS Lobectomy**
- Eligibility
- Consent
- Computer randomization

**Eligibility**
- Group PVB
- Group TEA
- Group PCA
Group PVB

- US-guided paravertebral catheter insertion

- **Prior to surgical incision** = initial bolus of 20mL of 0.5% ropivacaine

- **Perioperative** = 0.1 mL/kg/hr of 0.2% ropivacaine

- **Postoperative** = same infusion rate + adjuncts

- **Discharge** = infusion pump at same rate + hydromorphone PRN + adjuncts
Patient Name: ____________________________________________

Procedure:________________________________________________

Date of Discharge: ______________________

Surgeon: _________________________

Anesthesiologist: ____________________

A nurse will contact you daily and inquire about your pain on a scale of 1 – 10.

You will be asked if you have felt any nausea/vomiting, urinary retention, chest pain, shortness of breath, dizziness, metallic taste, numbness, or any other troublesome symptoms. If you are concerned with these symptoms, please shut off the infusion pump and contact your anesthesiologist immediately.

You will be asked if there’s any pain, erythema, and swelling around the catheter insertion site, as well the volume remaining on your infusion pump.

You will be given instructions upon discharge and again by phone regarding the steps to remove the catheter on POD#3. Catheters should be easily removed by gentle pulling.
Group TEA

- TEA w/ paramedian approach

- Prior to surgical incision = an initial bolus of 5 mL of 0.5% ropivacaine with 2 mcg/mL of fentanyl

- Perioperative = 0.1 mL/kg/hr of 0.2% ropivacaine with fentanyl at 2 mcg/mL

- Postoperative = same infusion rate + adjuncts x 3d

- Discharge = hydromorphone PRN + adjuncts
Group PCA

- No regional technique perioperatively

- standard perioperative analgesic management w/ IV opioid

- Postoperative = PCA pump + adjuncts

- Discharge = hydromorphone PRN + adjuncts
Perioperative management

- **Standard induction**
  - 1-2mcg/kg of remifentanil
  - 0.5-2mg/kg propofol
  - 0.5-1mg/kg rocuronium

- **Intubate w/ DL-ET**

- **Maintenance**
  - Desflurane or Sevoflurane
  - MAC adjusted as per clinical response
Perioperative management

- Ketorolac 30mg IV prior to extubation

- Standard postoperative adjunct
  - Tylenol 650mg PO q4h
  - Naproxen 500mg PO BID
Breakthrough pain

- IV bolus sufentanil for breakthrough pain

- **Trigger**: i) ↑RR >20/min or
  
  ii) ↑HR >20bpm
Primary outcome

VAS Pain score at rest
- 1, 6, 12, 24 hours
- daily until DC

Secondary Outcome

In hospital
1. Daily dermatome check
2. Opioid consumption
3. Anesthetic-related adverse events
4. Duration until meeting anesthetic DC criteria
5. Length of stay

Post-discharge
1. Daily VAS scores x 7 days
2. Opioid consumption
3. Anesthetic-related adverse events
4. Duration until return to regular ADLs
5. Patient satisfaction
Breakthrough pain

- Hydromorphone for breakthrough pain
  - Trigger: VAS score > 6

- Removed from the study and place on PCA pump
  - Trigger: VAS score > 8
Implications

- Ideal analgesia for VATS lobectomy?
- Feasibility of CPVB in outpatient setting?
- Outpatient CPVB improves patient outcome?
Potential challenge...

- Safety monitoring plan
- Importance of careful patient selection and education
- Not placebo-controlled – Sham?
Reference


Thank you!

- Questions?
- Feedbacks?