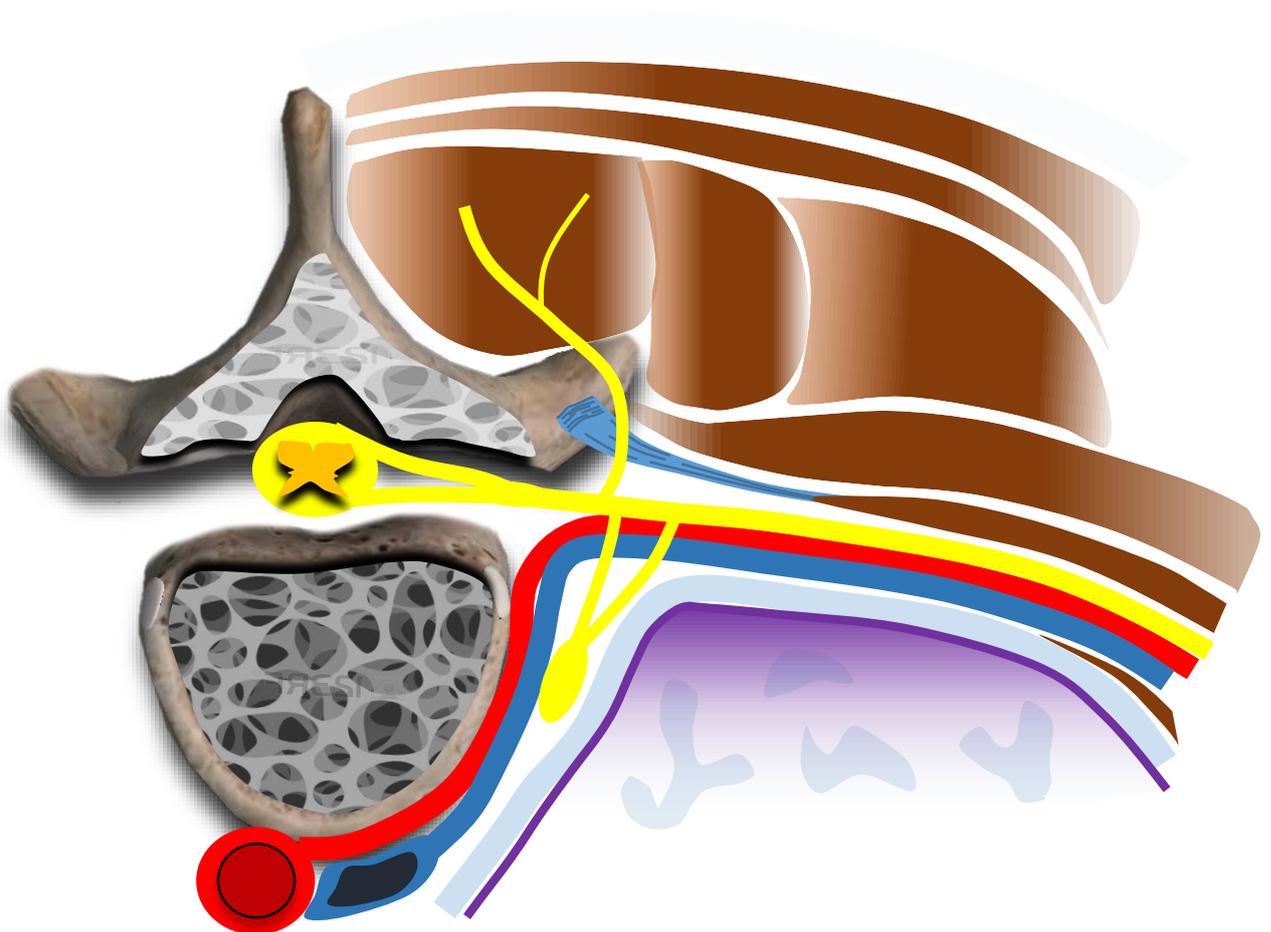


Master course of Regional Anesthesia:

ESP Block
in cardiac & thoracic surgeries to provide
a safe and efficient analgesia opioid free



Challenges to provide an pain free opioid free in open heart surgeries and other thoracic surgeries.

The pain after open cardiac surgery

In 2017 Open heart surgeries still present moderate to severe acute post operative pain [1,2]. The pain may originate from the surgical incision, the sternotomy, the mediastinal drains and the thoracic spine (costo transverse and costo vertebral joints). A painful postoperative period after cardiac surgery may promote patho physiologic transformation in major organs which could lead to extensive postoperative morbidity [3]. Breakthrough pain during movement and physiotherapy is important after open cardiac surgery limiting the daily activity programs of the patients and rehabilitation. The current multimodal analgesia associating paracetamol, nefopam, NSAIDs and opioids is not optimal. It may have shown good efficacy for postoperative pain at rest, **without reaching the full pain relief.**

The use of opioids generated well-known side effects as delay in recovery time and hospital stay [4], nausea-vomiting, pruritus, respiratory depression, dependency and induced hyperalgesia syndrome and pain chronicisation after surgery [5].

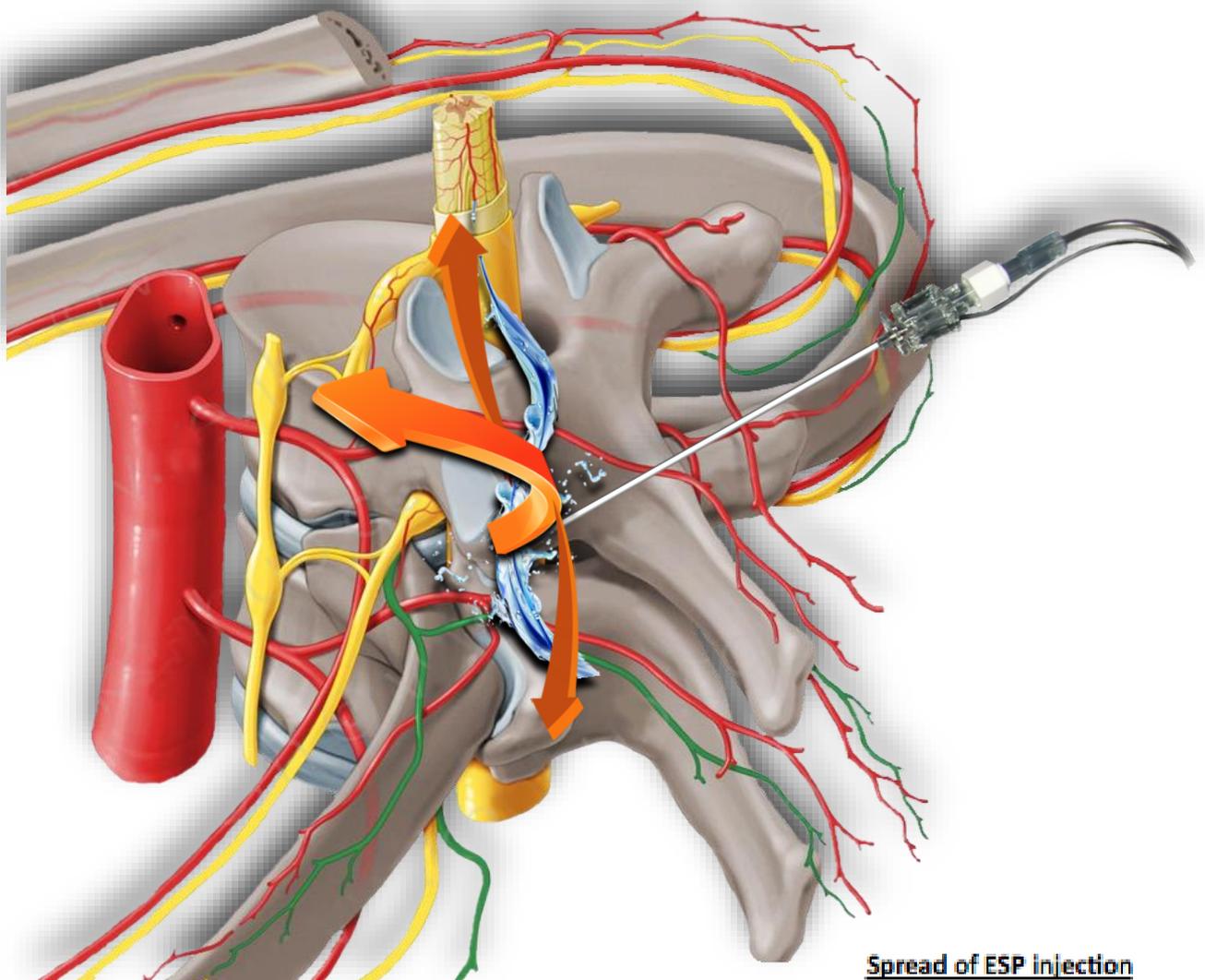
The risk of chronic pain is increased when patients present high acute pain episodes after surgery during three or four days[6]. After cardiac surgery the prevalence to develop a chronic pain is between 27 to 48% with moderate to severe pain more than one year after the surgery [7].

The evidences concerning the use of regional anesthesia analgesia techniques for post-op pain relief:

- The impact of epidural and paravertebral blockade, spinal analgesia, nerve blocks, and new regional anaesthesia techniques on main procedure-specific postoperative outcomes is very important in opioids decreased use in the context of fast-track programs that are fully suggested after cardiac surgery.[8]
- Andrea et al showed in a Cochrane group meta-analysis that regional anesthesia techniques are able to prevent chronic pain after surgery compared to opioids or multimodal analgesia techniques [9].
- Many studies show that a complete pain relief after surgery improves the surgical outcome and the quality of life of the patients

The techniques of regional anesthesia available for open heart surgeries:

- A continuous LA IV infusion after cardiac surgery can reduce pain score at 72 hours, shorten time to ambulation, and reduce morphine consumption at 48 hour.
- Thoracic epidural analgesia and intrathecal morphine administration that can effectively treat pain, but have several concern related to their potential complications due to the peri-operative anticoagulation and the unacceptable risk of epidural hematoma [10].
- The bilateral continuous paravertebral block that has equivalent analgesic effects to epidural analgesia but It is an advanced technique of regional anesthesia and not all anesthesiologists are skilled to perform such advanced technique.
- Bilateral Parasternal multihole catheter inserted by the surgeon was described and published but it provides only the anterior pain relief
- The serratus plane block may block only external part of the sternal and the drain pain. It will not block the thoracic back pain
- **The ESP Block** recently described [11] is an inter-fascial block described as a safe quite simple technique, far from risky anatomical structures. Already a Prospective study on 59 adults for open heart surgeries was presented at the world congress of ASRA as oral communication [12] and a case reported by the team of Stanford University [13]. It was used also as rescue analgesia for thoracic surgery [14]. It has been published also in thoracic paediatric surgeries [15].



The expertise of VinMec Anaesthesia teams:

The anesthesia teams of VinMec International Hospitals central park and Times City

performed between May 2017 and April 2018:

- 302 Bilateral ESP catheters for 151 adults open heart surgeries.
- 68 bilateral ESP catheters for 34 Infants open heart surgeries.
- ESP Catheters for
 - Breast surgeries
 - Thoracic surgeries
 - Live donor Liver

During this period the data collected in open heart surgeries showed no complication or major incident. One incident: a catheter placed in Intra-vascular providing inefficient analgesia. Since an additive safety test was created to prevent such mis-location. The success rate of bilateral efficient analgesia opioid free is 96,8%.

First world cases presented during World Congress of regional anaesthesia and pain medicine in New York City April 2018.

Analgesia opioid free with bilateral ESP catheters for open heart surgeries in adults



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VinMec Healthcare System - Vietnam



2018 World Congress on
Regional Anesthesia & Pain Medicine
April 19-21, 2018 | New York Marriott Marquis, New York City, USA
www.aspa.com/world-congress | #ASPAWorld18



Introduction & objectives

Pain after cardiac surgery is moderate to severe (sternotomy, drains and thoracic back pain) [1]. The current multimodal analgesia may have shown good efficacy for postoperative pain at rest, without reaching the full pain relief. The use of opioids generated side effects as delay in recovery time and hospital stay, nausea-vomiting, respiratory depression, dependency and induced hyperalgesia syndrome and pain chronicity after surgery. The impact of regional anesthesia analgesia techniques on main procedure specific postoperative outcomes is very important in opioids decreased use in the context of fast-track programs and are fully suggested after cardiac surgery. [2]

The Erector Spinae Plane Block (ESP) was recently described [3]. It is an inter-fascial plane block whereby local anesthetic is injected within a plane anterior to the erector spinae muscle, to achieve multi-metameric analgesia for thoracic surgery. Its analgesic effect appears due to local anesthetic diffusion into the paravertebral space, affecting both the dorsal and ventral ramus of the thoracic spinal nerves [Fig1]. This pilot study is to evaluate the analgesia provided by peri-operative bilateral ESP catheters for open heart surgeries.

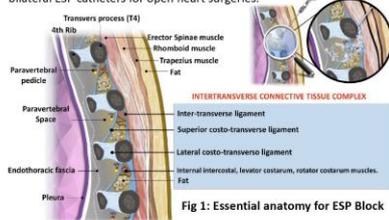


Fig 1: Essential anatomy for ESP Block

Materials & Methods

Ethical approval (# 06/2017/HDDD-VMCE) After Patient informed consent obtained, we enrolled 40 consecutive adult patients for elective open heart surgery. After usual Anesthesia induction for these surgeries, the bilateral insertion of ESP catheter was performed under Ultrasound (US) guidance at T4 level by anesthesiologist recently trained to the technique.

After US verification of the position of the tip catheter in the interfacial plane [Fig 2&3] at T5 an induction dose of Ropivacaine 0.5% 0.25mL/kg/ side was given 30 minutes before incision combined to the infiltration of the inter-clavicular ligament by the surgeon just before the sternotomy with 1mL of Ropivacaine 0.5%. At the end of the surgery an infusion of Intermittent Automatic Bolus (IAB) of Ropivacaine 0.2% 0.15mL/kg/side/6h was started with IV paracetamol 0.5g/6h stopped 4 hours after drain removal.

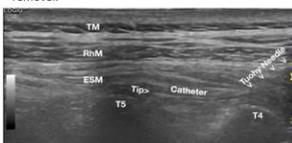


Fig 2
TM Trapeze Muscle
RhM Rhomboide M.
ESM Erector Spinae M.
Tip of the Catheter at T5 level in the interfacial space below fascia of ESM.

Results

No additional dose of IV sufentanil needed for sternotomy.
Reduction of perioperative doses of sufentanil required;
0.21 [0.19-0.24]mcg/kg-h Vs usually without ESP 0.71[0.63-0.89] mcg/kg-h.
Pain level after extubation; rest: 1.41 [0.98-1.81] Mob.: 2.25[2.00-2.49]
Pain drain removal: no pain or mild pain
No Opioid from end of surgery to patient discharge
No Hematomae or complication reported
Pain level at 1 months Max VAS> 2 = 34% VAS>4 = 0%.

Discussion

Clinical results indicate that local anesthetic injected over the transverse process and beneath the erector spinae muscle spreads cranial and caudal to achieve multiple vertebral levels, and reaches the paravertebral space to anesthetize dorsal and ventral rami as well as the rami communicants which supply the sympathetic chain. The exact pathway by which the local anesthetic reaches the spinal nerves is still undefined. Doses of local anesthetics are very low due to the IAB (168 mg of Ropivacaine/day for a 70kg patient) compared to bilateral Paravertebral block [5]. It shows also that interfacial blocks need volume effect.

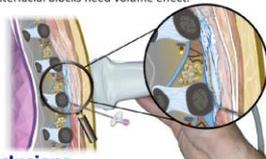


Fig 3
Tip of the Catheter at T5 level in the interfacial space below fascia of ESM.

Conclusions

For the first time, this study showed that continuous peri-operative analgesia by ESP blocks is effective and avoid post operative opioids. It needs more studies to evaluate all benefits on the surgical outcomes.

1 Mueller XM, Tinguely F, Tevearai HT, Revelly JP, Chiolero R, von Segesser UK. Pain location, distribution, and intensity after cardiac surgery. Chest 2000; 118:391-6.
2 Carl F, Kohler H, Baidon G, Steed A, McKee K, Singer P, Hemmerling T, Salinas F, Neal JM. Evidence basis for regional anesthesia in multidisciplinary fast-track surgical care pathways. Reg Anesth Pain Med. 2011 Jan-Feb; 36(1):63-72.
3 Foreni M, Razarathnam M, Adhikary S, Chin KI. Continuous Erector Spinae Plane Block for rescue analgesia in thoracotomy after Epitural Failure: A case report. A A Case Report. 2017 May 15;8(10):254256.
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Ultrasound Guided Thoracic Erector Spinae Plane Blocks Within an Enhanced Recovery Program Decreases Opioids Consumption and Improves Patient Postoperative Rehabilitation after Open Cardiac Surgery: A Controlled Before and After Study

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Open cardiac surgery may cause severe postoperative pain with risk of pain chronicisation. The current multimodal analgesia doesn't reach full pain relief.

We hypothesized that patients receiving care in fast track recovery protocol (FTP) using continuous erector spinae plane block (ESP) would decrease perioperative opioid consumption and improve early outcome parameters compared to standard management.

Method: This approved controlled Before and after trial compared an historical group of 20 consecutive patients versus a prospective group of 49 patient having continuous bilateral ESP after anaesthesia induction for open heart surgery by sternotomy. Induction dose of 0.25mL.Kg⁻¹.side⁻¹ of Ropivacaine 0.5%. Post-operative analgesia for both groups paracetamol. In Control group: Morphine IV 30 mcg.kg⁻¹min⁻¹. In the ESP group, 8 h after the loading dose, the catheters were connected to a pump to infuse Intermittent Automatic Boluses (IAB) every 6h of Ropivacaine 0.2% in the catheters. If needed in both groups, additional analgesia provided by ketorolac 30mg(IV) morphine IV.

Results: ESP group required less morphine (p<0.001) and less sufentanil (p<0.001). Times to drain removal, first mobilisation, pain VAS values 2 hours after drain removal and pain VAS value at rest one month after surgery and postoperative adverse events were significantly decreased. There was no difference for extubation time, pain during first mobilization and at one month after surgery.

In conclusion, our study suggests, with limitations, that the use of a continuous ESPB within a FTP allows a significant decrease in opioids consumption and optimizes times for rapid patient mobilization and drain removal after open cardiac surgery.

MASTER COURSE : ESP BLOCK

The course will be conducted in English with Vietnamese translation

Faculty members

Nga Ho MD

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Chin Quach MD

Anesthesiologist
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Hanoi – Vietnam

Philippe Macaire MD

Director of Anesthesiology and Pain
VinMec Healthcare System
Hanoi - Vietnam

DAO NGUYEN THI NGOC MD

Anesthesiologist
Anesthesia Department, University Medical Center at Ho Chi Minh city, Vietnam

Educational Program in ESP BLOCK

Course objectives: Upon successful completion of the course, the

Participant will be able to:

1. Know the requirements to perform regional anaesthesia analgesia in Thoracic surgeries.
2. Know the neuro and sono anatomy required to perform ESP blocks
3. Know the safety processes
4. Know how to manage analgesia by Interfascial catheters
5. Know the process and tips for the ultrasonographic scan for ESP blocks.
6. Know the infusion regimen of local anaesthetics for ESP blocks

1 day intensive Course combining lectures, workshops hands on model, live demonstration and simulation on phantom

2 sessions per year

CME Accreditation

xxxx CME credits by VinMec

Educational material

Booklet or e-Book with:

- The check list for open heart surgeries with ESP catheters
- The setting list
- The Bibliography
- The training plan
- the catalogue of the devices
- The speaker slides in PDF
- The infusion regimen for
 - Adults
 - infants

Program it will start from June 2018

8.00 Welcome

8.30 – 10.30 LECTURES

8.30 – 8.50 : Anatomy for ESP

8.50 – 9.10 : The block performance

9.10 – 9.30 ; The outcomes in cardiac surgery

9.30 – 9.50 : The infusion of LA and follow up

9.50 – 10.10 ; The settings

10.10 – 10.30 : discussion

10.30 – 10-45 ; Coffee break

10.45 – 12-00 WORKSHOP HANDS ON

●**Station 1 ; Ultrasound scans on model**

●**Station 2 : How to set up Intermittent automatic boluses**

12.00 – 13-00 ; Coffee break

13.00 – Live case Demo from the OT by webcam

14.00 – Video cases

15.00 – 15.15 Coffee break

15.15 – 17.00 WORKSHOP HANDS ON

●**Station 1 ; Ultrasound scans on model**

●**Station 2 : Phantom probe needle coordination**

17.00 – Certificates

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- ¹³ Tsui BCH, Navaratnam M² Boltz G, Maeda K, Caruso TJ. Bilateral automatized intermittent bolus erector spinae plane analgesic blocks for sternotomy in a cardiac patient who underwent cardiopulmonary bypass: A new era of Cardiac Regional Anesthesia. *J Clin Anesth.* 2018 Apr 19;48:9-10
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