ORIGINAL ARTICLE

Pectoralis (PecS) nerve block 1 for port-a-cath removal and central venous catheter (CVC) replacement

Massimo Renzini[1], Umberto Ripani[2], Luisa Golia[3], Fulvio Nisi[3], Fabio Gori[1]

[1]Department of Pain Medicine Hospital S.M.M, Perugia, [2]Division of Clinic Anaesthesia, Department of Emergency Hospital Riuniti, Ancona, [3]Department of Anaesthesia, Intensive Care and Pain Medicine, Hospital S.M.M., Perugia; Italy

ABSTRACT

Aim The use of PecS block 1 as perioperative analgesia for a central catheter removal -reimplantation combined procedure.

Methods A 55-year-old woman suffering from peritoneal metastases from gastric cancer needed to have a port-a-cath implanted for infection removed and to have a central venous catheter (CVC) implanted in the homolateral axillary vein due to patient's history of deep vein thrombosis of the right upper limb. We used PECS 1 block for perioperative analgesia.

Results Compared to the traditional catheter implantation technique, reduction in the doses of local anaesthetics, shortening in the execution time, less intra-procedural bleeding, better patient's compliance, and no need for a rescue dose of local anaesthetic were observed.

Conclusion The PEC1 block was effectively and safely used to remove an infected port-a-cath and to place a CVC on the same side. We hypothesize that it may be useful also for simple port-a-cath positioning.

Key words: complication, local anaesthesia, outcomes, pectoralis block, port-a-cath

Corresponding author:
Umberto Ripani
Division of Clinic Anaesthesia,
Department of Emergency Hospital Riuniti
Conca Street 71,
60126 Ancona AN, Italy
Phone: +39 071 596 3809;
Fax: +39 071 596 3871;
E-mail: umberto.ripani@outlook.it
Massimo Renzini ORCID: https://orcid.org/0000-0001-7386-1520

Original submission:
06 March 2020;
Revised submission:
10 March 2020;
Accepted: 24 March 2020
doi: 10.17392/1158-20

Med Glas (Zenica) 2020; 17(2): 352-355

INTRODUCTION

Pectoran nerve (PecS) block 1 is a simple analgesic block performed by means of a local anaesthetic administration in the layer that separates two pectoral muscles, the pectoralis major and the pectoralis minor, at the level of the third rib (1). The interfascial administration of 20 mL of local anaesthetic is suitable to block the lateral pectoral nerve and most of the branches of the medial pectoral nerve (2). The block is performed with a linear probe positioned 3-4 cm distal to the coracoid process with a transverse view of the pectoralis minor muscle (3). It has been successfully used for perioperative analgesia in adult breast surgery (1-4) and minimally invasive cardiac surgery (3).

The traditional approach to the local anaesthesia for port-a-cath implantation requires the administration of 25-35 mL of local anaesthetic (4). It also needs two or three site punctures for best accomplishment, this being especially risky in patients on anticoagulant therapy (1-4). Moreover, it does not adequately reduce pain during the creation of the pocket for the porth-a-cath chamber placement (1-4).

We hypothesize that PecS block-1 may reduce both the dose of the local anaesthetic and the relative risk of toxicity, the number of site punctures required and, of course, ongoing pain during the creation of the pocket; this approach may work not only in the plant, but also in the removal of the port-a-cath.

The aim of this study was to describe this approach in one of our patients (5,6), who needed to have the port-a-cath for infection removed, and a new central venous catheter implanted.

PATIENT AND METHODS

Patient and study design

We presented a case of a 55-year-old woman suffering from peritoneal metastases from gastric cancer previously treated with radiotherapy and surgical removal. She had no other relevant diseases in her past medical history. She had no coagulation deficiency but she was on anticoagulant treatment with low molecular weight heparin for prevention of venous thromboembolism and chemotherapy for neoplasm treatment. Our attention was drawn to the septic state due to infection of the implanted port-a-cath (in the left axillary vein) by *Bacteroides vulgatus*. In addition to this, the lack of peripheral venous access and the need to continue antibiotic therapy and parenteral nutrition required the placement of a new central venous catheter (CVC) after the removal of the port-a-cath.

Methods

According to the RaCeVA protocol (7), we performed systematic ultrasound examination of the venous system and excluded implanting the new CVC in the right axillary vein due to the patient's history of deep vein thrombosis of the right upper limb and because the vessel did not show any patency while imaging (lack of collapse if compressed). Thus, we decided to remove the left axillary port-a-cath and to position the new central catheter in the homolateral axillary vein. With an ultrasound-guided and sterile technique, PecS block 1 was performed (Figure 1) with mepivacaine 200 mg and levobupivacaine 50 mg.

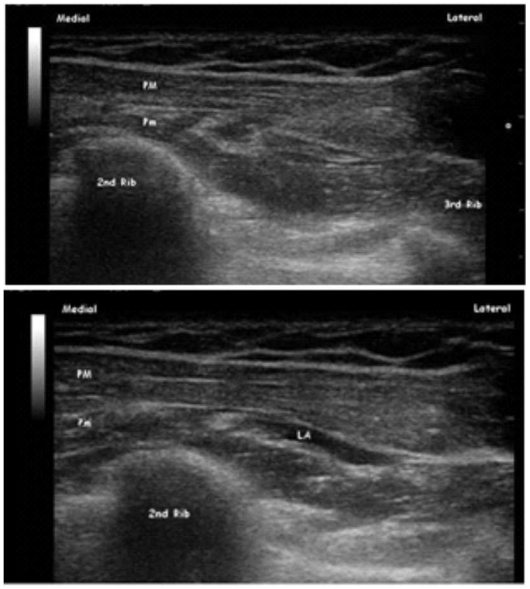

Figure 1. The PecS block 1 performed with an ultrasound-guided technique. The needle tip reaches and injects the local anaesthetic mixture in the layer between the pectoralis major and pectoralis minor muscles (left); the 2nd rib acts as a protecting fence against unintentional pleural puncture (Ripani U, 2018) PM, pectoralis major muscle; Pm, pectoralis minor muscle; LA, local anesthetic mixture injected

RESULTS

The patient presented mild pain at the incision of the pocket (numeric rating scale, NRS: 4) (8), while all other phases of the procedure (port-a-cath removal, pocket closure, ultrasound-guided puncture of the axillary vein, CVC implantation) were pain

free (NRS: 0). There were no immediate complications, such as bleeding. The procedure was judged easy to perform by the operator and it required about 30 minutes for completion (Figure 2). It was observed that the dose and volume of the used anaesthetic was reduced comparing to the classic method. Within one month after the procedure the patient did not show any late complication.

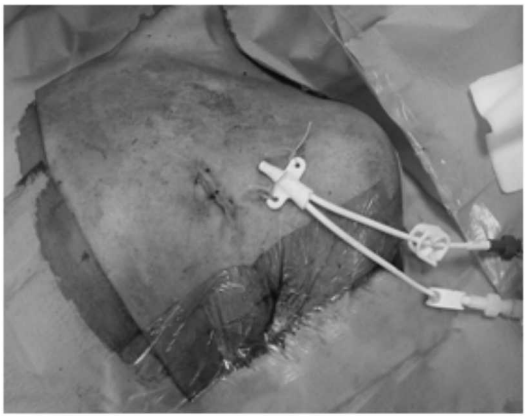

Figure 2. The result at the end of the procedure. Patient's left shoulder is showed. The new implanted catheter is clearly visible ahead, while the entrance point of the old one has been sutured caudally (Ripani U, 2018)

DISCUSSION

In this case we performed an ultrasound-guided PecS block 1 with 20 mL of local anaesthetic (mepivacaine 1% 10 ml and levobupivacaine 0.5% 10 ml) to provide analgesia for a central catheter removal-reimplantation combined procedure. A skin incision was made in the left port-a-cath site. The catheter was removed and its pocket was closed. A two-way CVC was then placed in the same left axillary vein with an US-guided technique. There are no similar procedures described in the literature.

Moreover, we did not find any published study comparing port-a-cath placement and removal under the local anaesthesia with the classic technique and PecS -1 block.

Recently, a clinical experience on children undergoing implantation and removal of port-a-cath has been published by the Stanford hospital (2). Authors have retrospectively analysed the impact of PecS 1 block versus the traditional technique on the need for rescue analgesia, long acting opioids use, postoperative pain scores and post-anaesthesia care unit length of stay; all parameters analysed were in favour of the PecS 1 group but without showing any statistical significance, perhaps due to small sample.

In our experience we routinely performed the same comparison on adult patients and we observed a reduction in the doses of local anaesthetics, a shortening in the execution time, less intra-procedural bleeding, better patient's compliance, and no need for rescue dose of local anaesthetic. Thus, we hypothesize that PecS 1 approach may be used successfully to implant a port-a-cat, replacing the traditional approach.

The PECS block has already been used successfully in breast surgery, pacemaker placement and upper limb surgery (1,3,9-26). We have effectively and safely used the PecS 1 block to remove an infected port-a-cath and to place a CVC on the same side with a reduction of pain and doses of local anaesthetic used and without any early or late complication.

We hypothesize that it may be useful also for port-a-cath positioning in terms of reduction of local anaesthetic doses and relative risk of toxicity, reduction of the risk of periprocedural complications (such as bleeding). However, as there are currently no randomized trials in literature confirming these hypotheses and clinical observations, large sample clinical trials are needed yet.

FUNNDING

No specific funding was received for this study.

TRANSPARENCY DECLARATION

Conflict of interest: None to declare.

REFERENCES

1. Kulhari S, Bharti N, Bala I, Arora S, Singh G. Efficacy of pectoral nerve block versus thoracic paravertebral block for postoperative analgesia after radical mastectomy: a randomized controlled trial. Br J Anaesth 2016; 117:382–6.
2. Farrukh Munshey F, Ramamurthi RJ, Tsui B. Early experience with PECS 1 block for Port-a-Cath insertion or removal in children at a single institution. J Clin Aesth 2018; 49: 63–4.
3. Yalamuri S, Klinger R, Bullock W, Glower DD, Bottiger BA, Gadsden JC . Pectoral fascial (PECS) I and II blocks as rescue analgesia in a patient undergoing minimally invasive cardiac surgery. Reg Anesth Pain Med 2017; 42:764–6.
4. Blanco R. The 'pecs block': a novel technique for providing analgesia after breast surgery. Anaesthesia 2011; 66:847–8.

5. Falzarano G, Piscopo A, Grubor P, Rollo G, Medici A, Pipola V, Bisaccia M, Caraffa A, Barron EM, Nobile F, Cioffi R, Meccariello L. Use of common inflammatory markers in the long-term screening of total hip arthroprosthesis infections: our experience. Adv Orthop 2017; 2017:9679470.
6. Franzese, R, Conte M, Gagliardo N, Pieretti, G. Children vs elderly in orthopedic surgery site of infection. Are there difference? Experience of a high volume plastic surgeon consultant. Acta Med Sal 2109; 49:24–9.
7. Spencer TR, Pittiruti M. Rapid Central Vein Assessment (RaCeVA): a systematic, standardized approach for ultrasound assessment before central venous catheterization. J Vasc Access 2019; 20:239-49.
8. Hawker GA, Mian S, Kendzerska T, French M. Measures of adult pain: Visual Analog Scale for Pain (VAS Pain), Numeric Rating Scale for Pain (NRS Pain), McGill Pain Questionnaire (MPQ), Short-Form McGill Pain Questionnaire (SF-MPQ), Chronic Pain Grade Scale (CPGS), Short Form-36 Bodily Pain Scale (SF-36 BPS), and Measure of Intermittent and Constant Osteoarthritis Pain (ICOAP). Arthritis Care Res (Hoboken). 2011; 63 Suppl 11:S240-52.
9. Rollo G, Prkic A, Bisaccia M, Eygendaal D, Pichierri P, Marsilio A, Giaracuni M, Meccariello L. Grafting and fixation after aseptic non-union of the humeral shaft: a case series. J Clin Orthop Trauma 2020; 11(Suppl 1):S51-5.
10. Gómez-Garrido D, Triviño-Mayoral V, Delgado-Alcala V, Cervera-Irimia J, Medina-Lorca M, Sánchez-Sánchez F, Ibáñez-Vicente C, Pérez-Gurbindo I, Meccariello L, Rollo G, Pica G, Tomarchio A, Pasquino A, Bisaccia M. Five year long term results of total joint arthroplasties in the treatment of trapeziometacarpal osteoarthritis. Acta Biomed 2019; 90:451-6.
11. Rollo G, Prkić A, Pichierri P, Eygendaal D, Bisaccia M, Filipponi M, Giaracuni M, Hitov P, Tanovski K, Meccariello L. Plate-and-bone-strut fixation of distal third humeral shaft aseptic non-unions: a consecutive case series. J Clin Orthop Trauma 2019; 10(Suppl 1):S127-32.
12. Rinonapoli G, Bisaccia M, Meccariello L, Mancini GB, Marrani F, Grubor P, Rollo G, Caraffa A. Transient osteomyelitis of the distal radius in a three-year-old patient. Med Glas (Zenica) 2020; 17:178-82.
13. Rollo G, Meccariello L, Rotini R, Pichierri P, Bisaccia M, Fortina M. Efficacy of the "Salento technique", a modified two-incision approach in distal biceps brachii tendon repair. Surgical description and outcomes analysis. J Clin Orthop Trauma 2019; 10:959-64.
14. Rollo G, Porcellini G, Rotini R, Bisaccia M, Pichierri P, Paladini P, Guerra E, De Cruto E, Franzese R, Grubor P, Pace V, Meccariello L. A new plate design to treat displaced 3-4 parts proximal humeral fractures in comparison to the most tested and used plate: clinical and radiographic study. Med Glas (Zenica) 2019; 16:284-92.
15. Rollo G, Bisaccia M, Irimia JC, Rinonapoli G, Pasquino A, Tomarchio A, Roca L, Pace V, Pichierri P, Giaracuni M, Meccariello L. The advantages of type III Scaphoid Nonunion Advanced Collapse (SNAC) treatment with partial carpal arthrodesis in the dominant hand: results of 5-year follow-up. Med Arch 2018; 72:253-6.
16. Rollo G, Rotini R, Eygendaal D, Pichierri P, Bisaccia M, Prkic A, Stasi A, Meccariello L. Effect of trochleocapitellar index on adult patient-reported outcomes after noncomminuted intra-articular distal humeral fractures. J Shoulder Elbow Surg 2018; 27:1326-32.
17. Rollo G, Pichierri P, Marsilio A, Filipponi M, Bisaccia M, Meccariello L. The challenge of nonunion after osteosynthesis of the clavicle: is it a biomechanical or infection problem? Clin Cases Miner Bone Metab 2017; 14:372-8.
18. Rollo G, Rotini R, Pichierri P, Giaracuni M, Stasi A, Macchiarola L, Bisaccia M, Meccariello L. Grafting and fixation of proximal humeral aseptic nonunion: a prospective case series. Clin Cases Miner Bone Metab 2017; 14:298-304.
19. Medici A, Meccariello L, Rollo G, De Nigris G, Mccabe SJ, Grubor P, Falzarano G. Does routine carpal tunnel release during fixation of distal radius fractures improve outcomes? Injury. 2017 Oct; 48(Suppl 3):S30-3.
20. Bisaccia M, Meccariello L, Rinonapoli G, Rollo G, Pellegrino M, Schiavone A, Vicente CI, Ferrara P, Filipponi M, Caraffa A. Comparison of plate, nail and external fixation in the management of diaphyseal fractures of the humerus. Med Arch 2017; 71:97-102.
21. Manni M, Bisaccia M, Rinonapoli G, Schiavone A, Meccariello L, Mccabe SJ, Bisaccia O, Vicente CI, Cappiello A, Caraffa A. Reliability, feasibility and value of ecography in clinical-functional results in patients affected by carpal tunnel syndrome: is there a correlation? Acta Inform Med 2017; 25:44-8.
22. Bisaccia M, Rinonapoli G, Falzarano G, Medici A, Meccariello L, Rosati R, Pellegrino M, Ibáñez Vicente C, Piscitelli L, Caraffa A. Clinical and radiological outcomes of distal radius fractures treated with orif with volar plates. EMBJ 2016; 11:9-14.
23. Bisaccia M, Rinonapoli G, Bisaccia O, Meccariello L, Ibáñez Vicente C, Ceccarini P, Colleluori G, Andrea Schiavone A, Caraffa A. Articular fractures of distal radius: comparison of treatment and clinical and radiological outcomes with volar plate versus hoffmann bridging external fixator. EMBJ 2017; 12:18–23.
24. Rollo G, Bisaccia M, Franzese R, Pichierri P, Filipponi M, Giaracuni M, Gomez-Garrido D, Ripani U, De Cruto E, Pieretti G, Meccariello L. The biomechanical potential of the bone graft in the proximal ulna non-union surgery. Clin Cases Miner Bone Metab 2019; 16:53-61.
25. Di Giacinto S, Meccariello L. Supracondylar fractures of the humerus, gartland 3: pediatric urgency. Case report and literature review. EMBJ 2016; 11(S1):6.
26. Falzarano G, Medici A, Meccariello L. Challenges of the sub-amputated humerus: to amputate or not? A case study. EMBJ 2016; 11(S1):4-5.