International Journal of Research in Medical Sciences
Nagtilak HH et al. Int J Res Med Sci. 2021 Feb;9(2):617-619
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012

DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20210453

Case Report

Two broken pieces make a whole: adductor canal block

Harshada Hanamant Nagtilak*, Vidhya Deshmukh, Ankit Gupta, Hemant Mehta

Department of Anaesthesiology and Pain Management, Sir H N Reliance Foundation Hospital and Research Centre, Mumbai, Maharashtra, India

Received: 28 November 2020
Accepted: 31 December 2020

***Correspondence:**
Dr. Harshada Hanamant Nagtilak,
E-mail: harshadanagtilak35@gmail.com

ABSTRACT

Total knee arthroplasty (TKA) is expounded to intense postoperative pain with a desire for early ambulation and reduce postoperative complications. Adductor canal blockade (ACB) blocks primarily the pain sensation while preserving the quadriceps strength facilitating early rehabilitation after knee surgery. ACB has been gaining popularity over femoral nerve block (FNB), continuous epidural analgesia (CEA), and psoas compartment block (PCB). Studies show that use of ultrasound alone reduced the possibilities of vascular and multiple skin punctures. Though there's emerging evidence proving the efficacy of ACB, there's limited literature on safe use of continuous ACB catheters. We report 2 cases of catheter fracture with USG guided ACB employed in TKA.

Keywords: Adductor canal blockade, Catheter fracture, Ultrasound guided, Total knee arthroplasty

INTRODUCTION

Due to increasing aging population and subsequent increase in prevalence of osteoarthritis, demand for Total knee arthroplasty (TKA) is rising. TKA is related to moderate to severe postoperative pain. These patients need early ambulation to achieve function and prevent postoperative complications.[1] Postoperative pain following knee surgery is managed with systemic analgesics or regional blockade (neuraxial blockade or peripheral nerve blocks or periarticular infiltration). FNB was the gold standard regional analgesic technique for postoperative pain management following TKA. A recent development for multimodal pain management for total knee arthroplasty is ACB.[2] Although there's emerging evidence proving the efficacy of ACB over FNB, CEA, and PCB (1, 2, 3) Block-related adverse events were only poorly reported. There's limited literature comparing efficacy and safety of single shot ACB and continuous ACB catheters. We share the pain management and complication in two patients, in whom ACB catheters were inserted.

CASE REPORT

Case 1

A 69-year-old female was planned for left TKA under regional anaesthesia. Posterior capsule and incisional local infiltration was done during surgery. At the end of surgery under strict asepsis and under USG guidance, Left sided Adductor canal block was given with 18 G (5 cm) needle. 20 G catheter was threaded under USG guidance by catheter through needle technique. 20 ml of 0.25% bupivacaine + 75 mcg clonidine given after negative aspiration of blood. Catheter broke at 12 cm mark while removing the needle. Same explained to patient and relatives and consent for exploration to remove broken piece of catheter taken. Surgeon was called for the help. Under all aseptic precautions broken catheter piece was removed. 12 cm entire broken segment removed, patient withstood procedure well. Multimodal analgesia was used for postoperative pain relief and mobilization was satisfactory. Patient did not require IV narcotics.

Case 2

A 50-year-old female was posted for right TKA under regional anaesthesia. Posterior capsule and incisional local infiltration was done during surgery. For postoperative pain management continuous ACB catheter insertion was planned. Right sided Adductor canal block was given with 18 G (5 cm) needle. Under strict asepsis and under USG guidance by catheter through needle technique, 20 ml of 0.2% Ropivacaine + 8 mg Dexamethasone given after negative aspiration of blood. 20 G catheter threaded under USG guidance. While removing the needle catheter broke at 9 cm mark. Same explained to patient and relatives. Consent for exploration to remove broken piece of catheter taken. Surgeon was called upon for the same. Under all aseptic precautions broken catheter piece removed. 9 cm entire broken segment removed, patient withstood procedure well. Multimodal analgesia was used for postoperative pain relief with IV PCA fentanyl in addition to IV NSAIDS. Visual analogue scores were monitored postoperatively and were less than 3/10.

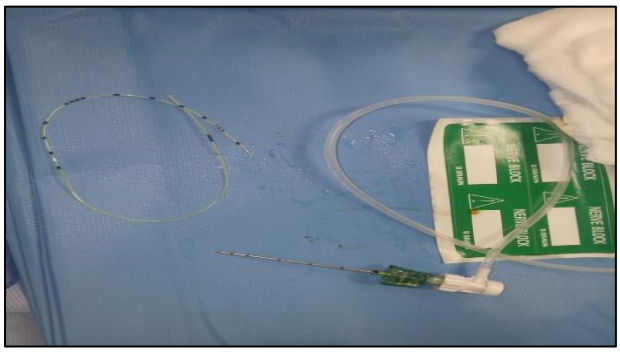

Figure 1: Broken fragment of ACB catheter.

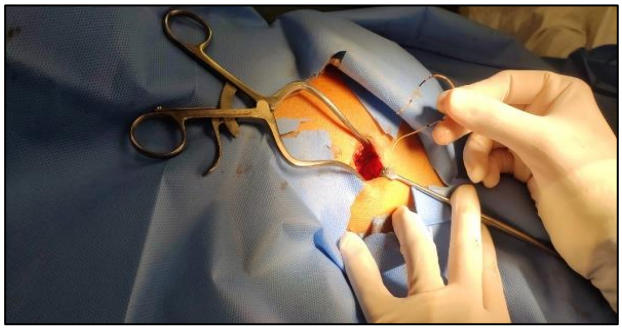

Figure 2: Removal of ACB catheter fragment.

DISCUSSION

Appropriate pain management following TKA can reduce postoperative pain and facilitate early rehabilitation. Improper management for postoperative pain may induce various complications related to immobility such as deep venous thrombosis, pulmonary embolism and muscle weakness. Therefore, post-TKA pain management is crucial, not only for patients' satisfaction, but for improving surgical outcomes and reducing complications.[5]

Recently, adductor canal block is being widely used option for postoperative pain treatment following knee surgery. Due to its various motor innervations to the quadriceps, Sartorius, and Pectineus muscles, the femoral nerve block is responsible for prolonging hospital stays ACB provides equivalent analgesia to a PCB as evidenced by equivalency in postoperative pain scores while causing significantly less quadriceps motor weakness.[1,3,5] It is hypothesized that ACB has better outcomes than CEA in terms of functional recovery with efficient pain control.[2] ACB has been shown to be an effective alternative to the FNB, CEA, and PCB. ACB which is performed most often via ultrasound, can be used as a single shot or as continuous nerve block provided through a catheter. Few studies have shown little benefits of indwelling catheter for 48 hours in terms of improving the quality of pain management with similar opioid usage, length of hospital stay, and functional outcomes.[4] There is no conclusive evidence of continuous ACB over single shot ACB. Single shot ACB with intraoperative periarticular infiltration can be a safer alternative.

There are side effects of ACB like other peripheral nerve blocks, such as catheter site infection, nerve palsy, ulceration of heel due to a decreased sensation, risk of falls due to motor blockade, failure of block.[5] Block (example: accidental vascular puncture) and catheter-related adverse events- tear, knots were only poorly reported.

We witnessed ACB catheter fracture in 2 cases of TKA while threading the catheter under USG guidance. Possible causes of the catheter fracture, tear as- weakness of catheter due to manufacturing defect, due to entanglement by resistance, sharp edge of needle, steep angle of needle while threading the catheter, pushing the catheter over sharp edge of needle, threading excess length of catheter, kinking of catheter. Initially we were using branula technique for placement of ACB. We switched over to catheter through needle technique. This might also be the reason that we have witnessed this adverse effect of catheter fracture now. Sharp edge of needle increased possibility of catheter damage in our cases. In catheter through needle technique there is sheath over blunt tipped graduated stimulator needle followed by catheter insertion through plastic sheath. Catheter is made up of polyamide (inert in nature). The soft tissue damage in terms of tissue reaction –like necrosis, fibrosis, and foreign body reaction is not significant. Once ACB catheter is fractured, there can be damage to nearby vascular structures in adductor canal and late neurological sequalae due to fibrosis near retained fractured fragments. We failed to visualize the broken fragment with the help of USG and X ray. So surgical exploration was preferred over leaving the retained fragments in place.

CONCLUSION

Possible ways to prevent catheter fracture can be- checking the needle and catheter for manufacturing defects, using slow force while threading and unthreading the catheter, avoiding tilting of needle over the sharp edge, avoiding to

keep extra length of catheter in situ, using more blunt needle while threading and unthreading.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Kuang MJ, Ma JX, Fu L, He WW. Is adductor canal block better than femoral nerve block in primary total knee arthroplasty? A GRADE analysis of the evidence through a systematic review and meta-analysis. The Journal of Arthroplasty. 2017;32(10):3238-48.
2. Alsheikh KA, Alkhelaifi AS, Alharbi MK, Alhabradi FA. Adductor canal blockade versus continuous epidural analgesia after total knee joint replacement: A retrospective cohort study. Saudi Journal of Anaesthesia. 2020;14(1):38.
3. Henshaw DS, Jaffe JD, Reynolds JW, Dobson S. An evaluation of ultrasound-guided adductor canal blockade for postoperative analgesia after medial unicondylar knee arthroplasty. Anesthesia & Analgesia. 2016;122(4):1192-201.
4. Elkassabany NM, Cai LF, Badiola I, Kase B. prospective randomized open-label study of single injection versus continuous adductor canal block for postoperative analgesia after total knee arthroplasty. The bone & joint journal. 2019;101(3):340-7.
5. Kim MK, Moon HY, Ryu CG, Kang H. The analgesic efficacy of the continuous adductor canal block compared to continuous intravenous fentanyl infusion with a single-shot adductor canal block in total knee arthroplasty: a randomized controlled trial. The Korean journal of pain. 2019;32(1):30.
6. Zhang LK, Zhang BY, Quan RF, Xu H. Single shot versus continuous technique adductor canal block for analgesia following total knee arthroplasty: A PRISMA-compliant meta-analysis. Medicine. 2019;98(20).
7. Lee S, Rooban N, Vaghadia H, Sawka AN, Tang R. A randomized non-inferiority trial of adductor canal block for analgesia after total knee arthroplasty: single injection versus catheter technique. The Journal of arthroplasty. 2018;33(4):1045-51.
8. Turner JD, Dobson SW, Henshaw DS, Edwards CJ. Single-injection adductor canal block with multiple adjuvants provides equivalent analgesia when compared with continuous adductor canal blockade for primary total knee arthroplasty: a double-blinded, randomized, controlled, equivalency trial. The Journal of arthroplasty. 2018;33(10):3160-6.
9. Schnabel A, Reichl SU, Weibel S, Zahn PK. Adductor canal blocks for postoperative pain treatment in adults undergoing knee surgery. Cochrane Database of Systematic Reviews. 2019(10).

Cite this article as: Nagtilak HH, Deshmukh V, Gupta A, Mehta H. Two broken pieces make a whole: adductor canal block. Int J Res Med Sci 2021;9:617-9.