

International Journal of Orthopaedics Sciences

ISSN: 2395-1958
IJOS 2018; 4(3): 642-647
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www.orthopaper.com
Received: 23-05-2018
Accepted: 24-06-2018

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The efficacy of periarticular local infiltration in pain management after bipolar hip hemiarthroplasty

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DOI: <https://doi.org/10.22271/ortho.2018.v4.i3l.113>

Abstract

Introduction: Hip fracture is still one of the most common injuries among the elderly, the incidence rate rises exponentially with age and the aging of the population will therefore ensure that hip fracture continues to be a major clinical challenge and public health problem in future. In hip surgery a variety of factors have been shown to influence outcomes, including participation in rehabilitation. The clinical importance of prompt participation and early mobilization in physical therapy is now widely recognized. Postoperative pain can delay physical therapy and impair mobility; much more attention is now being given to finding more effective ways of controlling pain after hip fracture surgery.

Materials and methods: This is a prospective randomized study conducted at tertiary care hospital in department of Orthopedics consists of 60 patients which were randomized into 2 groups were both groups were operated with Bipolar hip hemiarthroplasty with Group A(n=30) patients received periarticular local infiltration and Group B(n=30) received no infiltration.

Result: We have found that Group A had responded well with pain relief in 6hrs, 12hrs, 24hrs and 48hrs as compare to Group B but pain were same on 7th day post op in both Groups. Group A shown improvement with early rehabilitation therapy as compare to Group B.

Conclusion: We recommended that uses of periarticular local infiltration injection with drugs after Bipolar hip hemiarthroplasty i/v/o pain relief and early rehabilitation therapy.

Keywords: Bipolar hip hemiarthroplasty, elderly patients, periarticular local infiltration

1. Introduction

Hip fracture is one of the most common injuries among elderly and because the population is aging, it is expected to remain a major clinical challenge and public health problem in future^[1]. Hip fracture injury remains a leading cause of excessive morbidity and premature mortality among elderly. The incidence rate of hip fracture rises exponentially with age^[2]. Multimodal analgesia included periarticular local infiltration injection with anesthetic agent has been rapidly assimilated with demonstrated safety and efficacy, in the care of patients undergoing elective lower extremity arthroplasty. New techniques of multimodal pain management have been developed for many elective musculoskeletal surgical procedures^[3-22]. However postoperative pain is frequently undertreated in elderly patients²³. Inadequate pain control is associated with prolonged bed rest, delays in mobilization, and delays in rehabilitation therapy etc. which increase risk of functional impairment, thromboembolism and longer hospital stay^[24-26]. The present study was performed to check the safety and efficacy of surgical site, periarticular local infiltration injections for postoperative pain control following bipolar hip hemiarthroplasty. Optimal pain management is important after hip fracture treatment to ensure patient comfort and to facilitate early mobilization and ambulation in rehabilitation therapy.

2. Methods and Methodology

We studied prospectively 60 patients coming to the department of orthopedics in teaching hospitals attached to Byramjee Jeejubhoy Government medical college, Pune from March 2018 to July 2018. In the present study a total of 60 patients were studied and they were randomized into two groups according to a computer generated sequence.

Patients were divided into two groups, Group A (Case group) – consist of 30 patients who underwent bipolar hip hemiarthroplasty and were given periarticular local infiltration

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injections. Group B (Control group) – consists of 30 patients who underwent bipolar hip hemiarthroplasty and were not given any injection. Informed written consent is taken from all patients before including them in the study.

Table 1

Contents of Periarticular infiltration	
1.	Inj. Bupivacaine hydrochloride 0.5% (10ml)
2.	Inj. Dexamethasone sodium phosphate 4mg/ml (2ml)
3.	Inj. Tramadol hydrochloride (2ml)
4.	Inj. Ceftriaxzone 2gm in 10ml sterile water
5.	Inj. Gentamicin 80mg (2ml)

2.1 Data collection

Detailed history, clinical and radiological evaluation is recorded in study proforma.

2.2 Inclusion criteria

- Patients who are undergoing Hemiarthroplasty of hip for neck of femur fracture & pertrochanteric femur #
- Patients who have given Informed Written Consent for the proposed procedure
- Both sex(male & female)

2.3 Exclusion criteria

- Patients not willing to be part of the study
- Patients with uncontrolled angina or ischemic heart disease
- Patients with major psychological problem
- Patients with history of stroke or any neurological deficit
- Patients with allergies to any of the ingredients of the injection.
- Patients with renal insufficiency and abnormal liver enzymes
- Patients with remote source of infection
- Patients with vascular disease of lower limbs

Collection of data of the patients is as - Detailed history, Clinical examination both systemic and local.

Radiological evaluation using X-ray and other imaging modalities if necessary. Standard anteroposterior and Lateral view x rays of pelvis with both hip AP view of hip were taken. Other imaging modalities like 2D echo, ultrasonography and Doppler were done in necessary cases.

Investigations –Baseline and other investigations including complete hemogram, renal function, blood sugar levels, urine routine, coagulation profile, and blood and urine cultures were obtained. Specific investigations to rule out inflammatory arthritis are done.

Post op parameters assessed- VAS score, mobilization time, ambulation time, complication.

3. Procedure

3.1 Pre-Operative Protocol

Preoperative antibiotics in the form of intravenous ceftriaxzone were given just before induction of anaesthesia and same is continued postoperatively after surgery and 6hrs from last dose. Parts prepared with sterile clippers and scrub bath given twice, one on previous day and before shifting the patient to operation theatre. Sterile preparation of the part done in recovery and patient catheterized with Foleys catheter.

3.2 Patient Position

Patient induced under spinal anaesthesia. Lateral position given to all patients on simple surgical table. Foley's catheterization was done in every case. The patient was turned to the side with affected hip upwards in perfect lateral position with respect to operating table. Care was taken to generously pad all bony prominence especially the fibular head, lateral malleolus etc.

3.3 Preparation of the part

Through 10 min scrub of the part with povidine- iodine scrub solution was done. Final painting with 5% solution of povidine iodine was done. Sterile drapes were used for isolation. The leg was draped separately to allow movement through a full arc of motion during surgery.

3.4 Incision

Moore's southern approach was used in all the cases. After confirming the bony landmarks i.e. tip of G.T. and posterior superior iliac supine. Adequately long incision was made centering over tip of G.T. and extending along the femur.

3.5 Exposure

After incising subcutaneous tissues, fascia was incised along the skin incision and gluteus maximus muscle was split by blunt dissection along its fibres. Trochanteric bursa was excised.leg was internally rotated to expose the short external rotators of hip i.e. piriformis, superior gamelli, obturator internus, inferior gamelli and quadratus femoris.

The piriformis was identified and short external rotators were excised from femoral attachment. Fracture site exposed and capsule was excised.

'T' shaped incision was taken and incised capsule was retracted posteriorly towards the acetabulum. Femoral head was extracted out by inserting femoral extractor in the head or by flushing scoop in the joint scape. short curved scissor was used for cutting the ligamentum teres.

Diameter of the extracted head was measured and the correct size prosthesis was selected as guided by templates as well as intra-operative measurement.

3.6 Preparation of Trochanter

Preparation of the calcar and lesser trochanter was done by using bone saw

It is important to prepare the trochanter before putting an implant, to assess vertical and horizontal offset measurements intra op.

3.7 Preparation of the Femur and Insertion of prosthesis

The piriformis fossa was identified and the posterior and lateral most portion of the remaining neck was nibbled. Canal finder was introduced as lateral as possible. Rasp was now inserted with correct anteversion, as posteriorly and laterally as possible, so that prosthesis can be aligned properly in femoral canal. Prosthesis should be tight enough not to come out of canal after pulling the head ; if prosthesis was coming out of canal, it was found to be loose then cement was used. Decision of cementing also helped by preoperative assessment. Femoral canal is too wide or if prosthesis was found to be loose, bone cementing was done for proper metaphyseal fit and uniform load transfer from prosthesis to the bone.

PMMA cement was used. After preparation, femoral canal was dried by packing normal saline soaked roller guage while cement was being prepared.

Cement was inserted using gun from distal to proximal and pressurized by finger pressure. Prosthesis was inserted now respecting correct femoral anteversion.

In case of modular Prosthesis trial was done using different neck length and femoral head, final size was accessed and final prosthesis with appropriate neck length and head size was inserted. Once prosthesis is finally seated, the limb and prosthesis was held immobilized till cement was completely polymerized. Excess cement was removed using the knife and normal osteotome

3.8 Reduction of the hip

Traction was applied to the extremity and thumb pressure was applied over the prosthesis. The hip was relocated by gently externally rotating the extremity. After reduction, stability was tested on table by moving limb through range of motion. Stability in flexion, adduction, internal rotation was specially confirmed.

3.9 Periarticular infiltration

Periarticular injection were given by using 10ml syringe layer by layer from deep muscles layer to subcutaneous layer and wait for 10 min after that closure started layer by layer

3.9.1 Sites of Periarticular Infiltration

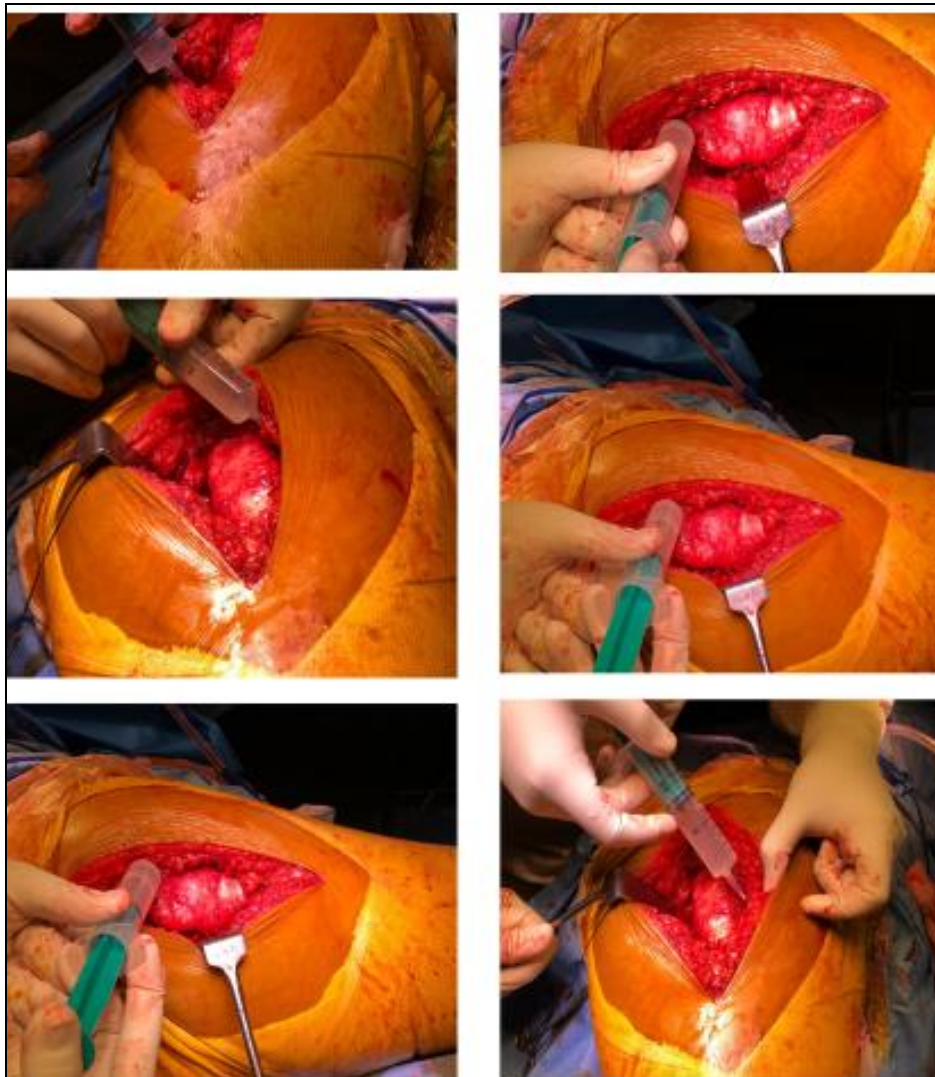


Fig 1

3.10 Closure

The suction drain was inserted. Short external rotators were re-attached to the femur, fascia is sutured. Subcutaneous tissue and skin were closed taking care to avoid any potential dead spaces.

Sterile dressings were applied. Patient was turned supine and the limb length compared. Abduction bar was given to avoid flexion and adduction of the limb for 3 days. Patient was shifted to ward

3.11 Post operative protocol

Routine analgesics in the form of paracetamol infusions, tramadol injections and diclofenac injections were given

whenever necessary. Post Operative. Post operatively VAS score was assessed at 6, 12, 24, hrs & 48 hrs post surgery and lastly on 7th day. Post-operative amount of analgesic used, time to mobilization and time of ambulation were assessed. Quadriceps exercises were started on post op day1 and protected weight bearing ambulation was started from post op day 2, in few cases the weight bearing was delayed due to pain. Postoperatively check x ray AP and Lateral view of pelvis with both hip of hip taken on day 1. The drain was removed on day 2, if used. Suture removal was done between 10 to 14days. Complications were looked for and patients followed regularly every monthly.

The results were analyzed using student T test.

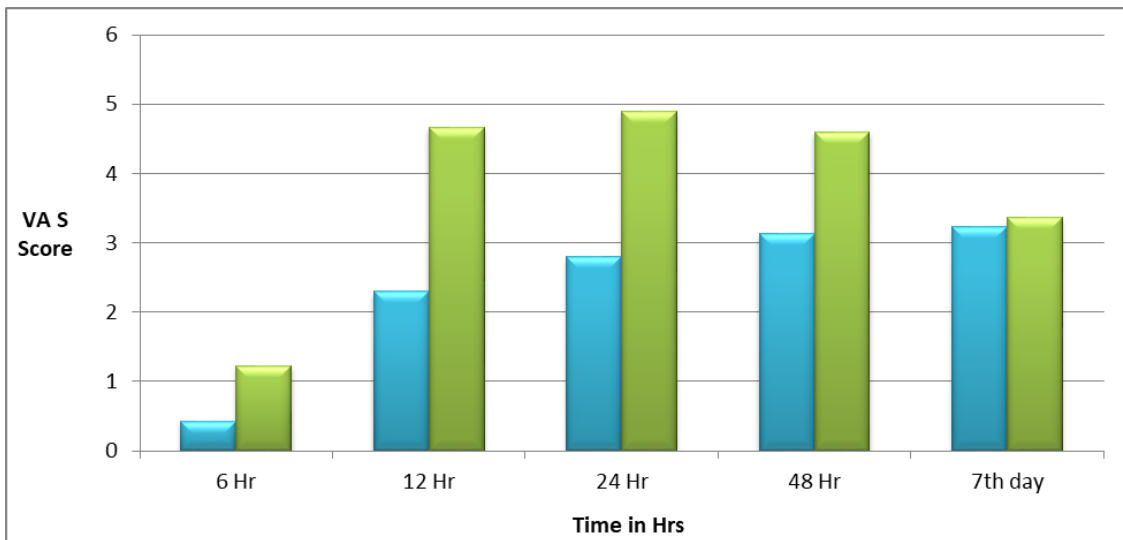
4. Result

Table 2

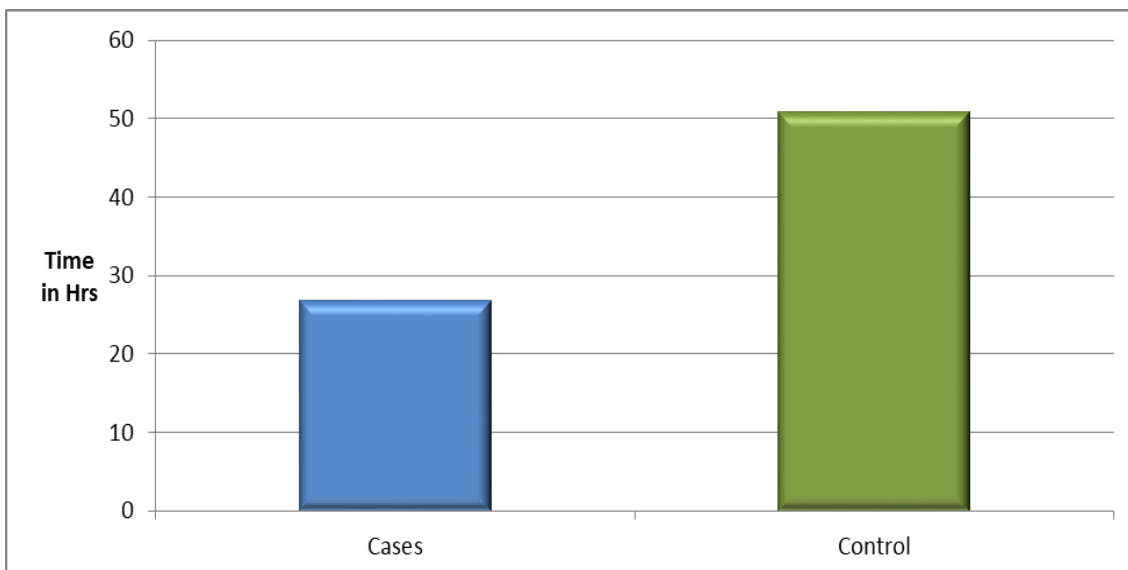
Demographic data	cases(n=30)	control (n=30)	t value	p value
AGE (year) ±sd	72±7.8	72±4.8	0.32	>0.05
SEX				
MALE	13	14		
FEMALE	17	16		
VAS SCORE				
6 Hrs	0.43±0.57	1.23±0.68	4.94	<0.0001
12 Hrs	2.3±0.59	4.67±0.47	16.94	<0.0001
24 Hrs	2.8±0.47	4.9±0.71	14.02	<0.0001
48 Hrs	3±0.00	4.6±0.49	17.56	<0.0001
7th day	3.23±0.4	3.36±0.49	1.11	>0.05
POST OP MOBILIZATION	26.8±5.16	38.4±8.5	6.34	<0.0001
POST OP AMBULATION	50.8±5.16	80.8±11.76	12.79	<0.0001

Table 2, shows that demographic variables like- age in cases was 72±7.8 Yrs where as it were 72±4.8 Yrs among controls. Out of 30 cases, 13 were male & 17 were females where as among 30 controls,14 were male & 16 were the females. VAS Score among the cases at 6Hrs, 12 Hrs, 24 Hrs, 48 Hrs

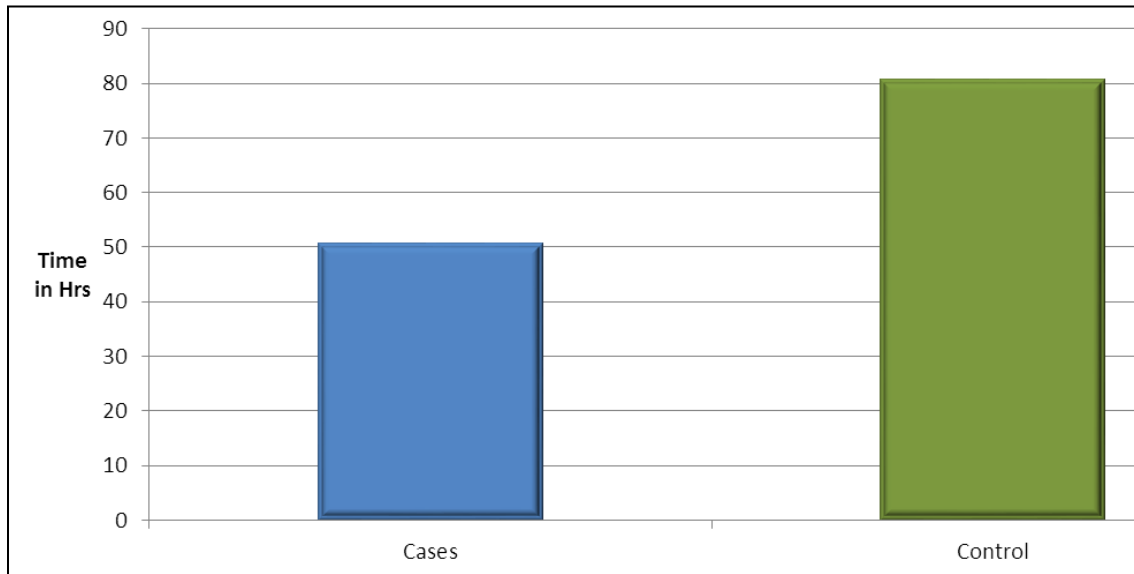
was significantly lower than controls (p value < 0.0001), whereas it was similar at 7th day (p value > 0.005) Post operative mobilization & Ambulation was significantly early in cases as compared to controls (p value < 0.0001)



Graph 1: showing VAS Score among cases & controls



Graph 2: Showing post operative mobilization among cases and controls



Graph 3: showing post operative ambulation among cases and control

5. Conclusion

In today's trend Orthopedic surgeons has been increasing interest in multimodal analgesia management for postoperative pain, early mobilization, early ambulation, less usage of drugs and reduced hospital stay following elective surgery. Multimodal analgesia combined with periarticular injection is now commonly used in care of patients treated with lower limb arthroplasty and the efficacy and safety profiles are excellent [3, 4, 6-10, 12-14, 16-22.]

This prospective randomized study demonstrates that intraoperative periarticular infiltration injections in elderly patients undergoing bipolar hip hemiarthroplasty for hip fracture significantly reduced pain postoperatively and initiation of early rehabilitation therapy.

There are numerous intervention studies have been done to reduced postoperative pain in hip fracture and improve early rehabilitation therapy in past two decades^{1, 22, 27}. In Hip fracture, pain severity is a significant predictor of functional outcomes and in connection with delay rehabilitation therapy, delay walking and postoperative complications^{7, 24-26, 28}.

Multimodal pain management benefits have been reported with elective orthopedic surgeries. Busch *et al.*²⁸ performed a prospective randomized study of sixty-four patients who received an intraoperative periarticular infiltration injections during hip arthroplasty and they concluded that there was pain relief postoperatively and VAS score was lower for pain those who had taken periarticular infiltration injections with early initiation of rehabilitation therapy that matches with our results. In present study pain was relief postoperatively according to VAS score 6Hrs, 12Hrs, 24Hrs and 48Hrs with early mobilization with ambulation compared to those who not received injections.

Peters *et al* [30] concluded that pain reduction had limited effect on activity during second postoperative day. But in present study patient who had received periarticular injection had initiated early mobilization after 24Hrs postoperatively and early ambulation after 48Hrs postoperatively as compared to those not received injections.

Our study concluded that multimodal analgesia combined with intraoperative periarticular injections around hips treated with bipolar hip hemiarthroplasty reduced postoperative pain with early mobilization and early ambulation.

6. References

1. David W, Fabi, MD Multimodal Analgesia in the Hip fractures patients. J orthop trauma. 2016, 30(5).
2. Marks R. Hip fracture epidemiological trends, outcomes, and risk factors, 1970-2009. Int J Gen Med. 2010; 3:1-17.
3. Vendittoli PA, Makinen P, Drolet P, Lavigne M, Fallaha M, Guertin MC, Varin F. A multimodal analgesia protocol for total knee arthroplasty. A randomized, controlled study. J Bone Joint Surg Am. 2006; 88(2):282-9.
4. Busch CA, Shore BJ, Bhandari R, Ganapathy S, MacDonald SJ, Bourne RB *et al.* Efficacy of periarticular multimodal drug injection in total knee arthroplasty. A randomized trial. J Bone Joint Surg Am. 2006; 88(5):959-63.
5. Fowler SJ, Symons J, Sabato S, Myles PS. Epidural analgesia compared with peripheral nerve blockade after major knee surgery: A systematic review and Metaanalysis of randomized trials. Br J Anaesth. 2008; 100(2):154-64.
6. Uesugi K, Kitano N, Kikuchi T, Sekiguchi M, Konno S. Comparison of peripheral nerve block with periarticular injection analgesia after total knee arthroplasty: A randomized, controlled study. Knee. 2014; 21(4):848-52. 2014,18.
7. Andersen KV, Pfeiffer-Jensen M, Haraldsted V, Søballe K. Reduced hospital stay and narcotic consumption, and improved mobilization with local and intraarticular infiltration after hip arthroplasty: A randomized clinical trial of an intraarticular technique versus epidural infusion in 80 patients. Acta Orthop. 2007; 78(2):180-6.
8. Kerr DR, Kohan L. Local infiltration analgesia: A technique for the control of acute postoperative pain following knee and hip surgery: A case study of 325 patients. Acta Orthop. 2008; 79(2):174-83.
9. Peters CL, Shirley B, Erickson J. The effect of a new multimodal perioperative anesthetic regimen on postoperative pain, side effects, rehabilitation, and length of hospital stay after total joint arthroplasty. J Arthroplasty. 2006; 21(6):32-8.
10. Kelley TC, Adams MJ, Mulliken BD, Dalury DF. Efficacy of multimodal perioperative analgesia protocol with periarticular medication injection in total knee arthroplasty: A randomized, double-blinded study. J

- Arthroplasty. 2013; 28(8):1274-7. Epub 2013.
11. Hebl JR, Kopp SL, Ali MH, Horlocker TT, Dilger JA, Lennon RL *et al.* A comprehensive anesthesia protocol that emphasizes peripheral nerve blockade for total knee and total hip arthroplasty. *J Bone Joint Surg Am.* 2005; 87(2):63-70.
 12. Lamplot JD, Wagner ER, Manning DW. Multimodal pain management in total knee arthroplasty: A prospective randomized controlled trial. *J Arthroplasty.* 2014; 29(2):329-34. Epub 2013.
 13. Mullaji A, Kanna R, Shetty GM, Chavda V, Singh DP. Efficacy of periarticular injection of bupivacaine, fentanyl, and methylprednisolone in total knee arthroplasty: A prospective, randomized trial. *J Arthroplasty.* 2010; 25(6):851-7. Epub 2009.
 14. Parvataneni HK, Shah VP, Howard H, Cole N, Ranawat AS, Ranawat CS. Controlling pain after total hip and knee arthroplasty using a multimodal protocol with local periarticular injections: A prospective randomized study. *J Arthroplasty.* 2007; 22(6):33-8. Epub 2007.
 15. Marino J, Russo J, Kenny M, Herenstein R, Livote E, Chelly JE. Continuous lumbar plexus block for postoperative pain control after total hip arthroplasty. A randomized controlled trial. *J Bone Joint Surg Am.* 2009; 91(1):29-37.
 16. Tammachote N, Kanitnate S, Manuwong S, Yakumpor T, Panichkul P. Is pain after TKA better with periarticular injection or intrathecal morphine? *Clin Orthop Relat Res.* 2013; 471(6):1992-9. Epub 2013.
 17. Busch CA, Whitehouse MR, Shore BJ, MacDonald SJ, McCalden RW, Bourne RB. The efficacy of periarticular multimodal drug infiltration in total hip arthroplasty. *Clin Orthop Relat Res.* 2010; 468(8):2152-9. Epub 2009. Dec 18.
 18. Tsukada S, Wakui M, Hoshino A. Pain control after simultaneous bilateral total knee arthroplasty: A randomized controlled trial comparing periarticular injection and epidural analgesia. *J Bone Joint Surg Am.* 2015; 97(5):367-73.
 19. Teng Y, Jiang J, Chen S, Zhao L, Cui Z, Khan MS, Du W. *et al.* Periarticular multimodal drug injection in total knee arthroplasty. *Knee Surg Sports Traumatol Arthrosc.* 2014; 22(8):1949-57. Epub 2013.
 20. Tsukada S, Wakui M, Hoshino A. Postoperative epidural analgesia compared with intraoperative periarticular injection for pain control following total knee arthroplasty under spinal anesthesia: A randomized controlled trial. *J Bone Joint Surg Am.* 2014; 96(17):1433-8.
 21. Jiang J, Teng Y, Fan Z, Khan MS, Cui Z, Xia Y. The efficacy of periarticular multimodal drug injection for postoperative pain management in total knee or hip arthroplasty. *J Arthroplasty.* 2013; 28(10):1882-7. Epub 2013.
 22. Kang H, Ha YC, Kim JY, Woo YC, Lee JS, Jang EC. Effectiveness of multimodal pain management after bipolar hemiarthroplasty for hip fracture: A randomized, controlled study. *J Bone Joint Surg Am.* 2013; 95(4):291-6.
 23. Morrison RS, Siu AL. A comparison of pain and its treatment in advanced dementia and cognitively intact patients with hip fracture. *J Pain Symptom Manage.* 2000; 19(4):240-8.
 24. Feldt KS, Oh HL. Pain and hip fracture outcomes for older adults. *Orthop Nurs.* 2000; 19(6):35-44.
 25. Morrison RS, Magaziner J, Gilbert M, Koval KJ, McLaughlin MA, Orosz G *et al.* Relationship between pain and opioid analgesics on the development of delirium following hip fracture. *J Gerontol A Biol Sci Med Sci.* 2003; 58(1):76-81.
 26. Morrison RS, Magaziner J, McLaughlin MA, Orosz G, Silberzweig SB, Koval KJ, Siu AL. The impact of post-operative pain on outcomes following hip fracture. *Pain.* 2003; 103(3):303-11.
 27. Daniel Koehler MD, J Lawrence, Marsh MD, Matthew Karam, MD Catherine Fruehling MA, Michael Willey, MD. Efficacy of Surgical-Site, Multimodal Drug Injection Following Operative Management of Femoral Fractures. *J Bone Joint Surg Am.* 2017; 99:512-9.
 28. Van Balen R, Essink-Bot ML, Steyerberg E, Cools H, Habbema DF. Quality of life after hip fracture: A comparison of four health status measures in 208 patients. *Disabil Rehabil.* 2003; 25(10):507-19.
 29. Busch CA, Whitehouse MR, Shore BJ, MacDonald SJ, McCalden RW, Bourne RB. The efficacy of periarticular multimodal drug infiltration in total hip arthroplasty. *Clin Orthop Relat Res.* 2010; 468(8):2152-9. Epub 2009.
 30. Peters CL, Shirley B, Erickson J. The effect of a new multimodal perioperative anesthetic regimen on postoperative pain, side effects, rehabilitation, and length of hospital stay after total joint arthroplasty. *J Arthroplasty.* 2006; 21(6-2):132-8.