

Role of addition of Dexamethasone and Ketorolac to lignocaine intravenous regional anesthesia (Bier's Block) to improve tourniquet tolerance and post-operative analgesia in hand and forearm surgery

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Abstract

Objective: To compare tourniquet tolerance and postoperative analgesia using lignocaine intravenous regional analgesia alone or with addition of dexamethasone and ketorolac.

Methods: The randomised, prospective study was conducted at Mayo Hospital, Lahore, from June 2013 to June 2014. Patients were divided into three groups: group I received lignocaine; group II received lignocaine and 30mg ketorolac; and group III received lignocaine, 30mg ketorolac and 08mg dexamethasone for intravenous regional anaesthesia. A total of 40ml solution was made by diluting it with normal saline. Motor and sensory block and recovery times were noted. Visual analogue scale was used to assess the severity of surgical and tourniquet pain, and total number of analgesic tablets taken in the first 24 hours after surgery were also recorded.

Results: The 180 patients in the study were divided into three equal groups of 60(33.3%) each, with each group having 30(50%) male and 30(50%) female subjects. In all the three groups, the sensory and motor onset and recovery time was the same ($P>0.05$). Lower pain scores were reported in groups II and III compared to group I ($p<0.001$). Patients of group II and III also required fewer analgesic tablets postoperatively and had longer postop time during which no analgesia was given compared to group I ($p<0.05$).

Conclusion: Bier block using lignocaine, dexamethasone and ketorolac provides better tourniquet tolerance in patients undergoing hand and forearm surgeries when compared to use of lignocaine alone and lignocaine and ketorolac.

Keywords: Bier's block, Ketorolac, Dexamethasone, Lignocaine. (JPMA 65: S-128 (Suppl. 3); 2015)

Introduction

In 1908, August Karl Gustav Bier described for the first time about the intravenous (IV) regional anaesthesia for surgeries of hand and forearm.¹ For the surgeries of forearm and hand of less than 01 hour it is an effective method of anaesthesia, but does not provide effective postoperative analgesia after tourniquet release. For IV regional anaesthesia, usually local anaesthesia such as lignocaine or prilocaine is administrated.^{2,3} Various medications like non-steroidal anti-inflammatory drugs (NSAIDs), opioids, dexamethasone, magnesium, neostigmine and tramadol have been administrated along with the local anaesthetic in the Bier block in attempt to improve intraoperative analgesia.⁴⁻¹⁴

Theoretically, both steroids and NSAIDs should be beneficial in the management of acute surgical pain induced by tissue injury. Different studies have reported an increase in duration of post-operative analgesia after the tourniquet release by adding dexamethasone and

ketorolac in Bier block (intravenous regional anaesthesia).⁹⁻¹¹

The current study was planned to compare the tourniquet tolerance and post-operative analgesia using lignocaine IV regional analgesia alone or with the addition of dexamethasone and ketorolac in combination or as sole adjunct.

Patients and Methods

The randomised, prospective study was conducted in Unit I of the Department of Orthopaedic Surgery and Traumatology, Mayo Hospital, Lahore, from June 2013 to June 2014. Patients with no co-morbidities and undergoing ambulatory hand and forearm surgeries were included after informed written consent was taken from each patient. Those with history of allergies to any medications used in the study were excluded. Three equal groups of patients were formed. After preoperative assessment, two IV cannulas were inserted: one of 22-G was inserted on the operative hand and the other of wide bore on the other limb for infusion. Ringer Lactate infusion was started and the patient was given 2mg of midazolam intravenously. No other analgesia was given before the surgery. Esmarch bandage was wrapped

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demonstrated relief from heel pain and allowed the patient to manage the condition more effectively. Besides, silicone heel pad treatment has shown short-term recovery times to be faster with decrease in pain levels, although long-term recovery times have been slow with slight increase in pain levels.

References

- Rosenbaum AJ, DiPrea JA, Misener D. Plantar heel pain. *Med Clin North Am* 2014; 98: 339-52.
- Molloy LA. Managing chronic plantar fasciitis: when conservative strategies fail. *JAAPA* 2012; 25: 48, 50, 52-53.
- Orchard J. Plantar fasciitis. *BMJ* 2012; 345: e6603. doi: 10.1136/bmj.e6603.
- Lareau CR, Sawyer GA, Wang JH, DiGiovanni CW. Plantar and medial heel pain: diagnosis and management. *J Am Acad Orthop Surg* 2014; 22: 372-80.
- Zhiyun L, Tao J, Zengwu S. Meta-analysis of high-energy extracorporeal shock wave therapy in recalcitrant plantar fasciitis. *Swiss Med Wkly* 2013; 143: w13825. doi: 10.4414/smw.2013.13825.
- Riddle DL, Schappert SM. Volume of ambulatory care visits and patterns of care for patients diagnosed with plantar fasciitis: a national study of medical doctors. *Foot Ankle Int* 2004; 25: 303-310.
- Rome K, Howe T, Haslock I. Risk factors associated with the development of plantar heel pain in athletes. *Foot* 2001; 11: 119-125.
- Peerbooms JC, van Laar W, Faber F, Schuller HM, van der Hoeven H, Gosens T. Use of platelet rich plasma to treat plantar fasciitis: design of a multi centre randomized controlled trial. *BMC Musculoskelet Disord* 2010; 11: 69. doi: 10.1186/1471-2474-11-69.
- Goff JD, Crawford R. Diagnosis and treatment of plantar fasciitis. *Am Fam Physician* 2011; 84: 676-682.
- Martinelli N, Bonifacini C, Romeo G. Current therapeutic approaches for plantar fasciitis. *Orthop Res Rev* 2014; 6: 33-40.
- Toomey EP. Plantar heel pain. *Foot Ankle Clin* 2009; 14: 229-245.
- American College of Foot and Ankle Surgeons. The diagnosis and treatment of heel pain. *J Foot Ankle Surg* 2001; 40: 329-40.
- Sinatra RS, de Leon-Casasola OA, Ginsberg B, Viscusi ER, eds. *Acute Pain Management*. New York, NY: Cambridge University Press; 2009. pp 621.
- Moertel CG, Ahmann DL, Taylor WF, Schwartz N. Relief of pain by oral medications. *JAMA* 1974; 229: 55-59.
- Taunton JE, Ryan MB, Clement DB, McKenzie DC, Lloyd-Smith RD, Zumbo BD. A retrospective case-control analysis of 2002 running injuries. *Br J Sports Med* 2002; 36: 95-101.
- Lapidus PW, Guidotti FP. Painful heel: report of 323 Patients with 364 painful heels. *Clin Orthop Relat Res* 1965; 39: 178-186.
- Yucel U, Kukuksen S, Cingoz HT, Anliacik E, Ozbek O, Salli A, et al. Full-length silicone insoles versus ultrasound-guided corticosteroid injection in the management of plantar fasciitis: a randomized clinical trial. *Prosthet Orthot Int* 2013; 37: 471-6.
- Pfeffer G, Bacchetti P, Deland J, Lewis A, Anderson R, Davis W, et al. Comparison of custom and prefabricated orthoses in the initial treatment of proximal plantar fasciitis. *Foot Ankle Int* 1999; 20: 214-21.
- Turlik MA, Donatelli TJ, Veremis MG. A comparison of shoe inserts in relieving mechanical heel pain. *Foot* 1999; 9: 84-87.
- Garrett TR, Neibert PJ. The effectiveness of a gastrocnemius-soleus stretching program as a therapeutic treatment of plantar fasciitis. *J Sport Rehabil* 2013; 22: 308-12.
- Crawford F, Thomson C. Interventions for treating plantar heel pain. *Cochrane Database Syst Rev* 2003; 3: CD000416.
- Landorf KB, Keenan A, Herbert RD. Effectiveness of foot orthoses to treat plantar fasciitis: a randomized trial. *Arch Intern Med* 2006; 166: 1305-10.
- Lynch DM, Goforth WP, Martin JE, Odom RD, Preece CK, Kotter MW. Conservative treatment of plantar fasciitis. A prospective study. *J Am Podiatr Med Assoc* 1998; 88: 375-80.
- Kulcu DG, Yavuzer G, Sarmer S, Ergin S. Immediate effects of silicone insoles on gait pattern in patients with flexible flatfoot. *Foot Ankle Int* 2007; 28: 1053-6.
- Bonanno DR, Landorf KB, Menz HB. Pressure-relieving properties of various shoe inserts in older people with plantar heel pain. *Gait Posture* 2011; 33: 385-89.