DOI: https://doi.org/10.53350/pjmhs2115123188

ORIGINAL ARTICLE

Role of Pre-operative Intravenous Methylprednisolone for Post-operative Pain Control after Intertrochanteric Femur Fracture Surgery

UMAIR SALEEM[1], KAMRAN AFZAL[2], SAQIB SHOAIB[3], FAREED AZAM KHAN[4]
[1]Senior Registrar, Department of Orthopaedic Surgery, POF Hospital Wah Cantt
[2]Senior Medical Officer, POF Hospital Wah Cantt
[3]Senior Registrar, Department of General Surgery, POF Hospital Wah Cantt
[4]Senior Registrar, Department of Anaesthesia, Izzat Ali Shah Hospital Wah Cantt
Correspondence to: Dr. Umair Saleem, E-mail: umair_saleem@hotmail.com Cell: 0336-5437684

ABSTRACT

Background: Intertrochanteric region are common in older ages. 33% females and 15% males in their 90s suffer from hip fracture, most commonly intertrochanteric fractures (50%). The pain associated with the surgery of the intertrochanteric fractures is quite troublesome and reduces patient mobilization thus increasing morbidity.
Aim: To compare preoperative intravenous methylprednisolone vs control in terms of mean VAS score in patients presenting with intertrochanteric femur fractures.
Study design: Randomized control trial
Place and duration of study: Orthopaedic Department & General Surgery Department POF Hospital Wah Cantt and Izzat Ali Shah Hospital Wah Cantt from 1st Jan 2020 till 31st Dec 2020
Methodology: Sixty patients were enrolled and divided in two groups. Thirty patients in methylprednisolone group and 30 patients in control Group were enrolled. Age 40-75 years old people of both genders with intertrochanteric femur fractures were included. Post-operative pain was recorded at resting position and 45° hip flexion position 24 hours post-surgery through VAS.
Results: In group A, 18 patients were males and 12 were female. In group B 19 patients were male and 11 were female. Mean age in group A was 56.37±4.56 years and in group B, 55.89±4.13 years. Mean VAS pain score in the control group was 5.03±1.542 while the mean VAS pain score in the treatment group was 3.70±15.79 (P=0.002).
Conclusion: Methylprednisolone preoperatively reduces postoperative pain at 24 hours after surgery in patients undergoing intertrochanteric fracture fixation.
Keywords: Methylprednisolone, Preoperative, Visual Analogue Scale, Pain, Postoperative'

INTRODUCTION

Fractures of hip, especially, intertrochanteric region are common in older ages. 33% females and 15% males in their 90s suffer from hip fracture, most commonly intertrochanteric fractures (50%).[1,2] Prevalence may increase with increase life expectancy and improving geriatric care.

Published data from National Joint Registry (NRJ) showed there were 71762 patients to whom total hip replacements (THRs) were done in 20111, this showed an increase from just over 56000 cases in 2005[3]. The situation is not very different in the developing nations, especially in the south Asian region which is becoming one of the most populated regions of the world and due to economic progress the life expectancy is also on the rise, thus, showing a potential of more increase in the rate of intertrochanteric or hip fractures[3,4].

Post operative pain is major morbidity for patients after surgery with severe metabolic changes resulting in cardiovascular, respiratory, digestive and urological problems.[1] Enhanced early postoperative recovery by reducing inflammatory response, through glucocorticoids use improves patient outcome[2].

NSAIDs and intravenous opiates are common painkillers used postoperatively. However NSAIDs slow bone healing process and peptic ulcer disease and opioids results in slow rehabilitation secondary to drowsines.[4,5]. New studies have shown steroid use as analgesic drug to be effective through anti-inflammatory and immuno-suppressive effect. Anti-inflammatory effect in body is through reduced production of multiple cytokines and interleukins resulting in reduced pain sensation[6,8]. A study by Rahimzadeh et al.[1] found out that methyl prednisolone was significantly better in post-operative pain relief than placebo (mean pain score 2.4±0.7 vs 2.2±0.8 respectively and p value <0.001. Moreover, there were less post- operative complications like nausea, vomiting, opioid consumption and fatigue in patients managed with preoperative methyl prednisolone when compared with placebo[1].

Evidence suggests that high-dose glucocorticoids can decrease post-surgical pain and early mobilization.

We hypothesize that methyl-prednisolone would reduce post- operative pain and time to meet functional discharge criteria after intertrochanteric femur fracture surgery.[9] Keeping in mind the critical nature of hip fractures and its relation with older age, this study will generate data regarding appropriate choice of therapy in these patients so that pain is optimized post-operatively.

MATERIALS AND METHODS

This randomized controlled trial study was done at Orthopedics Department and General Surgery Department, POF Hospital Wah Cantt and Department of Anaesthesia, Izzat Ali Shah Hospital, Wah Cantt 1st Jan 2020 till 31st Dec 2020 and enrolled 60 patients after IRB permission. They were divided in two groups; 30 patients were included in Methylprednisolone Group and 30 patients were included in Control Group. Age 40-75 years old people of both genders with intertrochanteric femur fractures were included. Patients who have CRF, IHD, DM, RA, neurologic disease, steroid use in last 6 month and sensitivity to methylprednisolone were excluded. In Methylpredinisolone group; 500 mg of MP diluted in 10 ml normal saline was given in dose of 2.5 ml. In control group 2.5 ml normal saline was given. Post-operative pain was evaluated in the rest state and 45° flexion of the hip 24 hours after surgery using VAS tool. Consumption of opioid (pethidine) and doses as well as other complications was recorded. Patients remained hospitalized for at least 3 days and were discharged after achieving stable condition and also following standard release criteria.

Data was entered and analyzed through SPSS-21. Mean pain score was compared between the two groups using student's t-test. Effect Modifiers like age and gender were

Received on 15-06-2021
Accepted on 27-11-2021

controlled by stratification and post-stratification t-test was applied. P-value ≤0.05 was considered significant.

RESULTS

There were 18 male patients in group A and 19 male patients in group B. 12 females were included in group A and 11 females were included in group B (Fig. 1) Mean age in group A was 56.37±4.56 years and in group B mean age was 55.89±4.13 years (Table 1).

The mean VAS pain score in the control group was 5.03±1.542 while the mean VAS pain score in the treatment group was 3.70±15.79 (p=0.002) [Table 2]. The mean VAS pain score in control group was 5.86±1.40 while in treatment group was 3.58±1.67 in males. Statistically the difference was significant (p=0.001). In females, the mean VAS pain score in control group was 4.34±1.40 and 3.78±1.55 in treatment group and there were no significant difference (P=0.289) [Table 3].

When the age was stratified according to mean VAS pain score, 5.67±1.41 in control group and 3.23±1.48 in treatment group age between 41-51 years, statistically significant (P<0.05) difference, 5.17±1.40 in control group and 4.17±1.46 in treatment group age between 52-64 years and 4.22±1.64 years in control group and 3.80±2.09 years in treatment group between age 65-75 years, statistically there were not significant (P>0.05) difference between ages and pain score (Table 4).

Table 1: Descriptive statistics of age

Group	Mean±SD
Group A	56.37±4.56
Group B	55.89±4.13

Table 2: Comparison of mean VAS pain score in control and treatment group

Pain VAS pain score	Control Group	Treatment	P value
	5.03±1.54	3.7±1.57	0.002

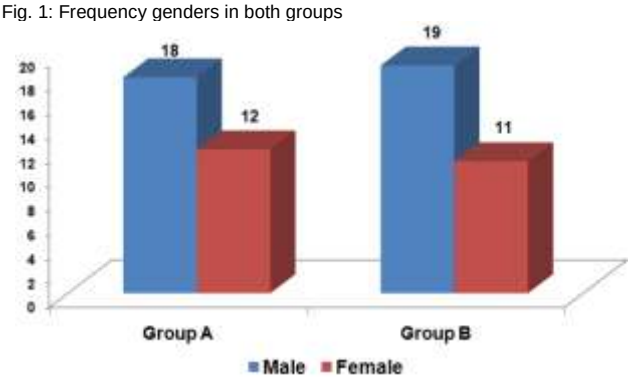
Table 3: Comparison of mean VAS pain score according to gender in control and treatment groups

Gender	Control Group	Treatment Group	P value
Male	5.86±1.40	3.58±1.67	0.001
Female	4.34±1.30	3.78±1.55	0.289

Table 4: Comparison of mean VAS pain score according to age in control and treatment groups

Age (years)	Control Group	Treatment Group	P value
41 – 51	5.67±1.41	3.23±1.48	0.001
52 – 64	5.17±1.40	4.17±1.46	0.102
65 – 75	4.22±1.64	3.80±2.09	0.379

Fig. 1: Frequency genders in both groups



DISCUSSION

Methylprednisolone is a synthetic glucocorticoid, with more stronger receptor bonding, effect and slight mineralocorticoid activity.[10] Glucocorticoids have innate anti-inflammatory effect on body organs secondary to arachnoid acid suppression. This suppression is due to inhibition of Lipocortin-induced phospholipase, resulting in prostaglandins and leukotrienes inhibition.[11] Pain is prevented by high cytokines level.[8] Samona et al[12] reported that single dose of dexamethasone administered during operation results in decreased opioid used post-operatively and less pain intensity during initial 24 h. Meta-analyses conducted on randomized controlled trial comparing methylprednisolone and placebo showed reduced pain on VAS scale in first 48 hours in methylprednisolone group as compared to placebo group.[13-15]

A randomized control trial including 75 patients of age >65 years divided patients into two groups; study and controls groups. Preoperatively, study group was administered single dose of 125 mg intravenous methylprednisolone, control group was administered saline solution as placebo. Pain severity was assessed on basis of visual analog scale. In methylprednisolone group significantly lower levels of the VAS score at rest after six, 12, and 18 hours post-operatively were observed.[16]

Luna et al[14] also confirmed similar results in their study. A randomized control trial by Lunn et al[2] included 48 patients undergoing unilateral THA under spinal anaesthesia showed less pain score in methylprednisolone group (P=0.01). Mathiesen et al[17] showed that 15 mg dexamethasone is more effective for reducing postoperative pain as compared to 5 mg dexamethasone.

Multiple randomized controlled trial included in a meta-analysis comparing methylprednisolone with placebo use after TKA (total knee arthoplasty) for postoperative pain relief in terms of visual analogue scale (VAS) scores showed significant improvement in pain score in methylprednisolone group post TKA[13]

Another randomized control trial included 48 patients undergoing total knee arthoplasty on one side. In Group A patients were administered preoperative methylprednisolone 125 mg IV and in group B patients were administered normal saline. Pain assessments were performed on basis of VAS. Results showed improved pain on walking in methylprednisolone group. (P,0.04).[2] Various other studies results proves role of methylprednisolone in reducing postoperative pain but all these studies have been small, single center trials[13-15]. To establish the efficacy of methylprednisolone in reducing postoperative pain further large multicenter trials are required.

CONCLUSION

Methylprednisolone preoperatively reduces postoperative pain at 24 hours after surgery in patients undergoing intertrochanteric fracture fixation.

Conflict of interest: Nil

REFERENCES

1. Rahimzadeh P, Imani F, Faiz SH, Nikoubakht N, Sayarifard A. Effect of intravenous methylprednisolone on pain after intertrochanteric femoral fracture surgery. J Clin Diagn Res 2014; 8(4):Gc01-4.
2. Lunn TH, Andersen LO, Kristensen BB, Husted H, Gaarn-Larsen L, Bandholm T, et al. Effect of high-dose preoperative methylprednisolone on recovery after total hip arthroplasty: a randomized, double-blind, placebo - controlled trial. Br J Anaesth 2013; 110(1):66-73.
3. National Joint Registry for England and Wales 9th Annual Report, 2012. Available at URL http://www.njrcentre.org.ok (date last accessed 27 August 2013) 2012.
4. Ibrahim MS, Twaij H, Giebaly DE. Nizam 1. Haddad FS. Enhanced recovery in total hip replacement: a clinicaI review. Bone Joint J 2013;95-b(12):1587-94.
5. Pasero C. Assessment of sedation during opioid administration for pain management. J Perianesth Nurs 2009;24(3):186-90.
6. Alimian M, Imani F, Faiz SH, Pournajafian A, Navadegi SF, Safari S. Effect of oral pregabalin premedication on post-operative pain in laparoscopic gastric bypass surgery. Anesth Pain Med. 2012;2(1):12-6.
7. Koh 1J, Chang CB, Lee JH, Jeon YT, Kim TK. Preemptive low-dose dexamethasone reduces postoperative emesis and pain after TKA: a randomized controlled study. Clin Orthop Relat Res 2013;471(9):3010-20.

8. De Oliveira GS, Jr., Almeida MD, Benzon HT, McCarthy RJ. Perioperative single dose systemic dexamethasone for postoperative pain: a meta-analysis of randomized controlled trials. Anesthesiology 2011:115(3): 575-88.
9. Shane E, Burr D, Abrahamsen B, Adler RA, Brown TD, Cheung AM, et al. Atypical subtrochanteric and diaphyseal femoral fractures: second report of a task force of the American Society for Bone and Mineral Research. J Bone Miner Res 2014;29(1):1-23.
10. Johnston PC, Lansang MC, Chatterjee S, Kennedy L. Intra-articular glucocorticoid injections and their effect on hypothalamic–pituitary–adrenal (HPA)-axis function. Endocrine 2015;48(2):410-6.
11. Husted H, Holm G, Jacobsen S. Predictors of length of stay and patient satisfaction after hip and knee replacement surgery: fast track experience in 712 patients. Acta Orthop 2008; 79: 168-73.
12. Samona J, Cook C, Krupa K, Swatsell K, Jackson A, Dukes C, Martin S. Effect of intraoperative dexamethasone on pain scores and narcotic consumption in patients undergoing total knee arthroplasty. Orthop Surg 2017; 9(1): 110-4.
13. Shen S, Gao Z, Liu J. The efficacy and safety of methylprednisolone for pain control after total knee arthroplasty: a meta-analysis of randomized controlled trials. Int J Surg 2018; 57: 91-100.
14. Luna IE, Kehlet H, Petersen MA, Aasvang EK. Clinical, nociceptive and psychological profiling to predict acute pain after total knee arthroplasty. Acta Anaesthesiologica Scandinavica 2017;61(6):676-87.
15. Karlsen AP, Dahl JB, Mathiesen O. Evolution of bias and sample size in postoperative pain management trials after hip and knee arthroplasty. Acta Anaesthesiologica Scandinavica 2018;62(5):666-76.
16. Gądek A, Liszka H, Zając M. The effect of pre-operative high doses of methylprednisolone on pain management and convalescence after total hip replacement in elderly: a double-blind randomized study. Int Orthop 2021;45(4):857-63.
17. Mathiesen O, Jacobsen LS, Holm HE, et al. Pregabalin and dexamethasone for postoperative pain control: a randomized controlled study in hip arthroplasty. Br J Anaesth 2008; 101: 535-41.