

Original Research Article

Is adding intra-articular steroid in total knee arthroplasty cocktail obligatory?

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ABSTRACT

Background: The patients can undergo total knee replacement surgery either under general anaesthesia, combined spinal and epidural anaesthesia, nerve root block, spinal combined with intra-articular knee cocktail. There is an ongoing debate amongst Arthroplasty surgeons whether to include steroid in the cocktail or not. The aim of this study is to assess whether there is an added benefit of including steroid in the intraarticular mixture.

Methods: This prospective study was conducted at Sri Ramachandra Institute of Higher education, Chennai between December 2017 to December 2018. The study was conducted in the Arthroplasty unit, Department of Orthopaedics. SRIHER ethics committee clearance was obtained prior to the start of the study. The inclusion criteria were patients who underwent total knee replacement surgery under combined spinal and intra-articular knee cocktail. Patients were divided into two groups based on the use of steroid in the intra-articular mixture. Patients were evaluated using Visual analogue scale, opioids usage as primary endpoint while any joint infection within six months of the surgery and knee society score at 1 month and 6 months as the secondary endpoint.

Results: The mean visual analogue score for the 0 pod for the group I and group II were 2.3 and 2.4 respectively. There was no case of infection in both groups.

Conclusions: There is no fringe benefit of adding steroid to the knee cocktail. So it is not obligatory to add steroid in intra-articular total knee arthroplasty cocktail.

Keywords: Opiods, Knee society score, Infection, Visual analogue score, Total knee replacement

INTRODUCTION

Total knee arthroplasty's primary objective is to relieve pain caused by severe arthritis generally in older patients with a more sedentary lifestyle. It also is clearly indicated in younger patients who have a limited function because of systemic arthritis.¹ The patients can undergo total knee replacement surgery either under general anaesthesia, combined spinal and epidural anaesthesia, nerve root block, spinal combined with intra-articular knee cocktail.²⁻⁴ There are various literature supporting combined spinal and intra articular knee cocktail as the best anaesthetic as intraoperative as well as post-

operative pain tolerance is far better than others. There is an ongoing debate amongst Arthroplasty surgeons whether to include steroid in the cocktail or not.⁵ The aim of this study is to assess whether there is an added benefit of including steroid in the intraarticular mixture.

METHODS

This prospective study was conducted at Sri Ramachandra Institute of Higher education, Chennai between December 2017 to December 2018. The study was conducted in the Arthroplasty unit, Department of Orthopaedics. SRIHER ethics committee clearance was

obtained prior to the start of the study. The inclusion criteria were patients who underwent total knee replacement surgery under combined spinal and intra-articular knee cocktail. The exclusion criteria were patients who underwent total knee replacement under any other anaesthesia methods and if the patient is diabetic, immunocompromised or more than eighty years of age. Patients were clearly explained in detail and who voluntarily opted for the study only included.

Patients were divided into two groups based on the use of steroid in the intra-articular mixture. The combination of drugs used in the cocktail was as per Ranawat cocktail combination containing bupivacaine 0.5% (200–400 mg) 24 cc, morphine sulphate 0.5% 8 mg 0.8 cc, epinephrine (1:1000) 0.3 cc, cefuroxime 750 mg in 10 cc of reconstituted normal saline and Sodium chloride 0.9% 22 cc.⁶ The patients in group I received spinal anaesthesia with the above combination of an intra-articular cocktail mixture. While patients in-group II underwent surgery under spinal anaesthesia with the same cocktail mixture with an additional 1 ml of methylprednisolone acetate. We had twenty-six patients in each group. Patients were allotted groups as per card method.

All the patients who underwent surgery were grade III or IV osteoarthritis knees as per Kellgren and Lawrence system of grading of osteoarthritis.⁷ All patients underwent surgery through a midline incision and medial parapatellar arthrotomy. Standard release and cut were made and the patella was resurfaced in all patients. Zimmer cruciate retaining implants were used. All the surgery were done by the same team of surgeons. All the patients underwent surgery under combined spinal and intraarticular cocktail. The intra-articular injection was done in eight sites with at least 2-3 cc in each site. The intraarticular injection sites were the suprapatellar pouch around quadriceps tendon, patellar fat pad, medial meniscus capsular attachment, lateral meniscus capsular attachment, posteromedial capsule, posterolateral capsule, medial retinaculum and lateral retinaculum.⁸ Routine wound closure was done with a drain in situ. Analgesics during first 5 days postoperative period was standardized and all patients received 50 mg per rectal diclofenac sixth hourly.⁹ If the patient has pain score more than 5, fentanyl injection was given and noted. Patients were evaluated using visual analogue scale, opioids usage as primary endpoint while any joint infection within six months of the surgery and knee society score at 1 month and 6 months as the secondary endpoint. The primary outcome assessments were done on 0, 3rd and 5th pod. If an infection occurs during the first six months postoperatively were considered positive for secondary outcome assessments.

RESULTS

Demographic data of patients participated in the study were tabulated in Table 1. The mean visual analogue score for the 0 pod for the group I and group II were 2.3

and 2.4 respectively. The mean VAS scores for 3rd and 5th postoperative days were tabulated in Table 2. The mean knee society score for both clinical and functional components for preoperative, end of the 1st month and sixth-month postoperative were tabulated in Table 3. Fentanyl was given to two patients in both groups in 0 postoperative day. Other than that none of the patients in both group required any opioids. There was no case of infection in both groups.

Table 1: Demographic data of patients.

Groups	Gender	No.	Age in years		
			55-64	65-74	>75
Group I	Male-07	26	2	5	0
	Female-19		12	6	1
Group II	Male-10	26	5	4	1
	Female-16		10	6	0

Table 2: Mean VAS score between groups.

Groups	0 Pod	3 rd Pod	5 th Pod
Group I	2.4	3.1	3
Group II	2.3	3	3.1

Table 3: Mean knee society score.

Group	Knee society score	Pre-op score	Mean 1st-month post op score	Mean 6 th -month post op score
Group I	Clinical score	29	79	90.1
	Functional score		67	82
Group II	Clinical score	40	79.2	91
	Functional score		74	88

DISCUSSION

Parvataneni et al is the pioneer of using intra-articular steroid injection in knee arthroplasty advocating the anti-inflammatory effect helps in decreasing post-operative swelling and pain.¹⁰ Steroids tend to decrease the stress response induced by surgery. While the exact mechanism of action still not known. There were many theories such as Inhibition of phospholipase A2, Genes activated include annexin-1 and SLP1, reduce expression of ELAM-1, L-selectin, E-selectin causing a decrease in pain were still in research stage.^{11,12} There are many studies indicating intraarticular steroid use does not confer additional risk of infection following total joint arthroplasty.¹³ There is currently no consensus for intraarticular steroid use and there is debate regarding a higher risk for wound infection.¹⁴

From Table 1, there is no significant difference between visual analogue score between two groups on 1st, 3rd and 5th postoperative days which implicit that by adding steroid to the cocktail mixture there is no added advantage of pain relief. A perfect mixture of cocktail and the injection site is important to give the best pain relief. The results of our study were comparable to the study by Zhao et al meta-analysis which also has a similar clinical agreement.¹⁵ The opioids usage in both groups were similar proving that there is no edge between group I and group II. Since VAS score and opioid consumptions were our primary endpoint it is clearly evident that adding steroid to knee cocktail is of no momentousness.

From Table 2 considering the clinical component of knee society score, there is no significant change between the two groups in both the 1st month and 6th month follow up. Even though there is a slight improvement of the functional component of knee society score in steroid group both at 1st and 6th month follow up it is not significant. There is no case of any tendon rupture or infection in both groups in our study. But there are many literature support for these catastrophic complications of steroid.^{16,17} Since there is no difference between the two groups for both primary and secondary endpoint it is worthwhile not to add steroid in the knee cocktail mixture as there will be a predicament in the mind of an operating surgeon.

The shortcomings of our study were small sample size and short follow-up period. There may be a bias in calculating the pain score in the early postoperative period as all our patients underwent surgery under spinal anaesthesia also. Even though there is no case of infection in our study especially after steroidal cocktail injection, a larger sample size with randomization would be needed to assess the impact of steroid on surgical site infection.

CONCLUSION

There is no fringe benefit of adding steroid to the knee cocktail. So it is not obligatory to add steroid in intra-articular total knee arthroplasty cocktail.

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Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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