Steroid-Enhanced Multimodal Cocktail Periarticular Injection in Total Knee Arthroplasty Does Not Increase Risks of Prosthetic Joint Infection

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INTRODUCTION:
The addition of corticosteroids to intra-operative multimodal cocktail periarticular injections (MCPI) during total knee arthroplasty offers well-documented benefits in postoperative pain relief and functional recovery. However, concerns remain about a potential increase in prosthetic joint infection risk due to the immunosuppressive properties of corticosteroids. Prior studies have been limited by small sample sizes and were underpowered to evaluate rare but serious complications such as prosthetic joint infection. This study aimed to evaluate whether the steroid-enhanced multimodal cocktail periarticular injections (MCPI-S) increases the risk of prosthetic joint infection in patients undergoing total knee arthroplasty. We hypothesise that corticosteroid use in multimodal cocktail periarticular injections does not increase the incidence of prosthetic joint infection.
METHODS:
We conducted a retrospective cohort study using a longitudinal institutional database, including 20,382 patients who underwent primary total knee arthroplasty between 2000 and 2018. Patients were categorised into two groups: MCPI-S group (including triamcinolone acetonide) and those receiving MCPI without corticosteroids. The primary outcome was the incidence of prosthetic joint infection within two years postoperatively. Demographic data and the type of surgical intervention for patients who developed prosthetic joint infection were also collected. A priori power analysis determined that 12,432 patients (6,216 per group) were required to detect a 0.5% difference in rate of prosthetic joint infection with 80% power. Statistical comparisons were conducted using Mann-Whitney U and Pearson's chi-squared tests, with significance set at $p < 0.05$.
RESULTS:
Of the total cohort, 10,094 patients received MCPI while 10,288 patients received MCPI-S. All patients had a minimum follow-up of 2 years. The analysis of demographic data is summarised in Table 1. The median age was slightly higher in the MCPI-S group (67.7 vs 67.3 years; $p = 0.025$), but the difference of 0.4 years is unlikely to yield any clinical significance. The overall incidence of prosthetic joint infection was 0.42% (89 cases). (Table 2) Prosthetic joint infections occurred in 0.51% (51 cases) of the MCPI group and 0.37% (38 cases) of the MCPI-S group ($p = 0.141$). Surgical interventions for prosthetic joint infection were comparable between groups ($p = 0.425$).
DISCUSSION AND CONCLUSION:
The addition of triamcinolone acetate to intraoperative periarticular injections during total knee arthroplasty does not increase the risk of prosthetic joint infection. This large, adequately powered study supports the safe incorporation of corticosteroids into multimodal periarticular injections, offering reassurance for their routine use in clinical practice to enhance postoperative recovery.

Table 1. Distribution of demographic data

	MCPI (n=10,094)	MCPI-S (n=10,288)	p-value
Median age (IQR)	67.3 (61.9-72.6)	67.7 (62.2-72.8)	0.025
Median BMI (IQR)	27.3 (24.6-30.4)	27.2 (24.7-30.4)	0.121
Number of women (%)	7872 (78.0)	8088 (78.6)	0.276
Ethnicity			0.297
Chinese (%)	8618 (85.4)	8861 (86.1)	
Malay (%)	708 (7.0)	657 (6.4)	
Indian (%)	609 (6.0)	616 (6.0)	
Other races (%)	161 (1.6)	154 (0.8)	
Patients with Diabetes (%)	1654 (16.4)	1695 (16.5)	0.863

Table 2. Analysis of prosthetic joint infections and interventions

	MCPI	MCPI-S	p-value
Prosthetic joint infections (%)	51 (0.51)	38 (0.37)	0.141
Intervention (%)			0.425
2-stage revision	28 (54.9)	24 (63.2)	
Debridement, Antibiotics and Implant Retention	21 (41.2)	13 (34.2)	
Debridement, Antibiotics and Implant Retention with subsequent revision	2 (3.9)	1 (2.6)	