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TITLE

Low Dose Aspirin for VTE Prophylaxis Results in Lower Rates of Periprosthetic Joint Infection After Total Joint Arthroplasty

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INTRODUCTION

Aspirin (ASA) is increasingly used by orthopaedic surgeons as post-operative venous thromboembolism (VTE) prophylaxis. However, there is no consensus on its role and dosage after orthopaedic oncologic surgery. In vitro studies have demonstrated an anti-staphylococcal effect at specific dose ranges. Optimal ASA dosage would facilitate antimicrobial effects while avoiding over-aggressive inhibition of platelet antimicrobial function. Our purpose was to determine the rate of prosthetic joint infection (PJI) after total joint arthroplasty (TJA) in patients receiving low-dose ASA (81mg bid), in comparison to high-dose ASA (325mg bid).

QUESTION

Does ASA dose used for VTE prophylaxis affect rates of PJI in primary total joint arthroplasty? Is there a platelet count cutoff that will predict the rate of PJI?

METHODS

We conducted a retrospective cohort study between 2008 and 2020. Eligible patients were older than 18 years, undergoing primary TJA, had a minimum follow-up of 30 days and received a full course of ASA post-operatively as VTE prophylaxis. Patients' records were reviewed for PJI, according to MSIS criteria. Entries were excluded if patients underwent a revision arthroplasty, had a previous history of coagulopathy or ASA regimen was not completed.

RESULTS

In total, 15,825 patients were identified, 8,761 patients received low-dose ASA, and 7,064 patients received high-dose ASA. More patients in the low-dose ASA cohort had a history of diabetes mellitus (7.1% vs. 2.53%, $p < 0.001$). Patients receiving high-dose ASA had a higher rate of PJI vs. patients receiving low-dose ASA (0.35% vs. 0.10%, $p = 0.001$). This relationship was maintained when comparing subgroups comprising total knee arthroplasty (TKA) (0.32% vs. 0.06%, $p = 0.019$) or total hip arthroplasty (THA) (0.38% vs. 0.14%, $p = 0.035$) solely, and accounting for potentially confounding demographic variables (OR 3.37, 95% CI 1.58 - 8.04, $p = 0.003$). There were no statistically significant differences in rates of post-operative MI, CVA, GI ulceration or hemorrhage. ROC/AUC analysis of platelet count as a variable for the development of PJI in both cohorts revealed no significant association.

CONCLUSION

When comparing low-dose to high-dose ASA as VTE prophylaxis, low dose ASA had a lower rate of PJI. This may be attributable to a balance of the anti-infective properties of ASA, and anti-platelet effects. The limitations of this

study include its retrospective nature and inclusion of only primary TJA at a single institution. The dose-dependency demonstrated in this study may be translatable to the orthopaedic oncologic population; however, more studies are needed to determine ASA's effectiveness and suitable dose for this group.

Table 1. Post-Operative Complications.

Complications	ASA 81mg bid (8,761)	ASA 325mg bid (7,064)	p-value
PJI - Total	**9 (0.10%)**	**25 (0.35%)**	**0.001**
PJI – Knee Only	**2 (0.06%)**	**11 (0.32%)**	**0.019**
PJI – Hip Only	**7 (0.14%)**	**14 (0.38%)**	**0.035**
Acute MI	3 (0.04%)	9 (0.14%)	0.114
CVA	5 (0.07%)	11 (0.17%)	0.159
GI ulcer	2 (0.03%)	1 (0.02%)	1.000
GI hemorrhage	4 (0.06%)	3 (0.05%)	1.000

Table 2. Logistic regression looking at PJI as primary outcome adjusting for demographic variables.

Predictor	Estimate	OR (95% CI)	p-value
ASA Dose			
81mg bid		Reference	
325mg bid	**1.216**	**3.37 (1.58 - 8.04)**	**0.003**
Age	0.010	1.01 (0.98 - 1.05)	0.569
Sex			
Female		Reference	
Male	0.614	1.85 (0.90 - 3.94)	0.098
BMI (Kg/m^2)	**0.095**	**1.10 (1.03 - 1.17)**	**0.003**
CCI	0.131	1.14 (0.75 - 1.55)	0.473
Operative time	0.005	1.01 (1.00 - 1.01)	0.134
TJA Site			
Knee		Reference	
Hip	0.474	1.61 (0.78 - 3.42)	0.205