Use of Dexamethasone in Diabetic Patients Undergoing Total Joint Arthroplasty: A Systematic Review and Meta-analysis

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INTRODUCTION: The American Association of Hip and Knee Surgeons (AAHKS) strongly recommends use of dexamethasone in patients undergoing total joint arthroplasty (TJA) due to its therapeutic effects. However, use in diabetic patients is controversial due to safety. Therefore, the primary objective of this study is to determine safety by: (1) calculating the post-operative glucose levels, (2) find ideal dexamethasone dosing regimen, and (3) report complications of dexamethasone administration in diabetic patients undergoing TJA.

METHODS:

A search following guidelines established by the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) was performed in three databases to find relevant studies. The query was performed utilizing the Boolean search phrase "((dexamethasone) AND (diabetic)) AND (((total joint) OR (total knee)) OR (total hip))." POD1, 2, and 3 glucose levels were compared between intervention and control groups with a random effects proportion meta-analysis weighted for individual study size. Weighted means and standard deviations were calculated for postoperative glucose levels.

RESULTS: 12 studies were included. Administration of dexamethasone in diabetic patients resulted in significantly elevated mean glucose levels (mg/dL) on POD1 compared to patients in which dexamethasone was withheld (170.1 ± 5.3 versus 158.1 ± 5.8, p=0.0007). However, 95% confidence interval levels were below the 200 mg/dL threshold. Additionally, there were no significant differences on POD2 (p=0.23) and POD3 (p=0.16). The risk of infection was not significantly different between intervention and control groups (Risk Ratio: 0.82, 95% CI: 0.39 - 1.72, p=0.61). Due to heterogeneity of data, and only four studies reporting exact dosages as opposed to ranges, ideal dosage of dexamethasone could not be found.

DISCUSSION AND CONCLUSION: Administration of perioperative dexamethasone in diabetic patients appears to be safe. Further investigation is warranted regarding dosage and timing of administration to optimize beneficial effects of dexamethasone while preventing excessive hyperglycemic effects in certain diabetic patients.

Figure 1: PRISMA Flow Diagram Depicting Article Selection Process