

Peri-Incisional Blisters After Total Knee Arthroplasty: Risk Factors and Clinical Implications

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INTRODUCTION: Peri-incisional blisters following elective total knee arthroplasty (TKA) are a recognized but underreported complication that negatively impacts post-operative recovery and overall patient satisfaction in the procedure. While severe blistering appears to be rare, it presents a clinical challenge, and there is limited guidance in the literature regarding optimal risk identification and prevention strategies. The aim of this study was to determine the incidence of postoperative blistering and identify patient and surgical risk factors associated with blister formation following TKA. Furthermore, we investigated whether blistering increases the risk of adverse outcomes such as manipulation under anesthesia, reoperation for wound complications, or infection.

METHODS: We retrospectively identified 23,405 uncomplicated primary TKAs performed in 20,035 patients at a single high-volume center between March of 2016 and April of 2022. TKAs with peri-incisional blisters were verified via manual chart review from 1,332 cases identified through an electronic medical record keyword search for “blister” documented within 90 days of TKA. Multivariable logistic regression models including patient age, sex, race, body mass index (BMI), Charlson Comorbidity Index, and year of surgery were performed to examine the association of these factors with blister formation and adverse outcomes.

RESULTS:

The incidence of 90-day blistering was 3.1% (714/23,405). The logistic model for blister formation showed that males (OR=1.35; 95% CI: 1.16-1.58), non-White/non-Black patients (OR=1.66; 95% CI: 1.32-2.09), patients with ≥ 1 Charlson comorbidity (OR=1.27; 95% CI: 1.09–1.49), and those on preoperative anticoagulation (OR=1.25; 95% CI: 1.07-1.47) had higher likelihood of developing postoperative blisters. Those with a BMI ≥ 40 also had higher risk compared to patients with BMI < 30 (OR=1.59; 95% CI: 1.25-2.01).

There was no association between postoperative blister formation and manipulation under anesthesia. However, blister formation was the strongest predictor of both reoperation and infection (OR=2.13; 95% CI: 1.5-3.03 and OR=4.28; 95% CI: 2.54-7.23, respectively), significantly exceeding current smoking status, the next strongest predictor of infection (OR=2.04; 95% CI: 1.09-3.82).

Among surgical factors, the use of robotic assistance was associated with increased odds of postoperative blister formation (OR=1.35; 95% CI: 1.05-1.74), while tourniquet inflation from procedure start to arthrotomy closure was associated with decreased odds (OR=0.71; 95% CI: 0.51-1.00) compared to no tourniquet. The use of advanced surgical dressings was associated with lower odds of blister formation (OR=0.57; 95% CI: 0.46-0.69). All associations were significant at $p < 0.05$.

DISCUSSION AND CONCLUSION: Postoperative blister formation following TKA, while uncommon, was associated with significantly increased risk of reoperation and infection, underscoring the importance of prevention. Blisters should be recognized as a clinical warning sign, prompting heightened postoperative monitoring and wound management to mitigate downstream complications.