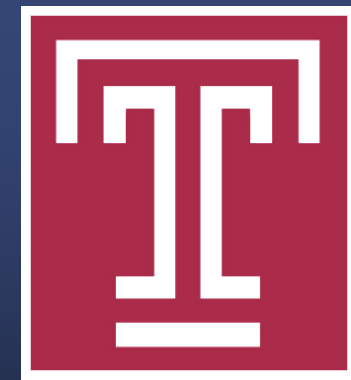


Morbidity and Mortality of the Transmetatarsal Amputation

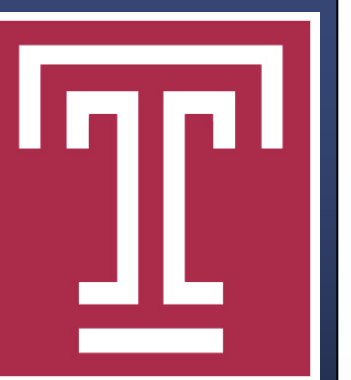
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Statement of Purpose and Literature Review

The transmetatarsal amputation is considered to be among the most durable partial foot amputations for diabetic limb preservation, despite recent retrospective reviews of the procedure demonstrating discouraging primary healing rates with high levels of conversion to more proximal amputation [1-5]. This is likely not consistent with contemporary quality improvement/performance improvement (QI/PI) models which assess procedures/surgeons/facilities, in part, on perioperative morbidity and mortality [6].

Therefore the objective of this investigation was to compare the morbidity and mortality of the transmetatarsal amputation to other frequently performed surgical procedures utilizing a large US database.

Methodology

The 2018 American College of Surgeons (ACS) National Surgical Quality Improvement Program (NSQIP) database was interrogated for the purposes of this investigation. We initially extracted data related to the Current Procedural Terminology (CPT) code 28805 (amputation, foot; transmetatarsal) and the variable labels “estimated probability of mortality” and “estimated probability of morbidity”. The estimated probability of mortality is defined by NSQIP as “probability of mortality is developed for all cases based on the a logistic regression analysis using the patient’s preoperative characteristics as the independent or predictive variables” [1]. The estimated probability of morbidity is similarly defined by NSQIP as “probability of morbidity is developed for all cases based on the a logistic regression analysis using the patient’s preoperative characteristics as the independent or predictive variables” [1].

We subsequently performed a CPT code search for those procedures occurring at a frequency greater than 10,000 in the database, and additionally extracted data for estimated probability of mortality and estimated probability of morbidity for these procedures.

The descriptive search of the NSQIP database for those CPT codes occurring at a frequency greater than 10,000 procedures resulted in identification of 17 procedures. This included 19301 (Partial mastectomy); n=16064), 27130 (Repair, revision, and/or reconstruction procedures on the pelvis and hip joint; n=40,313), 27245 (Treatment of intertrochanteric, peritrochanteric, or subtrochanteric femoral fracture; n=11,701), 27447 (Arthroplasty, knee, condyle and plateau; n=64,966), 35301 (Thromboendarterectomy, including patch graft; n=10,266), 43775 (Laparoscopy, surgical, gastric restrictive procedure; n=12907), 44204 (Laparoscopic excision procedures on the intestines; n=12,252), 47562 (Laparoscopic cholecystectomy; n=44,487), 47563 (Laparoscopic cholecystectomy with cholangiography; n=11,227), 49560 (Ventral hernia repair; n=10,907), 44970 (Laparoscopic appendectomy; n=43,978), 49505 (Open repair inguinal hernia; n=16824), 49585 (Open umbilical hernia repair; n=12785), 49650 (Laparoscopic inguinal hernia repair; n=13671), 58150 (Open hysterectomy; n=10,398), 58571 (Laparoscopic total hysterectomy; n=22435), and 63047 (Laminectomy; n=10,030).

The estimated probability of mortality and estimated probability of morbidity of these procedures were then individually compared to the estimated probability of mortality and estimated probability of morbidity for the CPT code 28805 (n=561).

Results

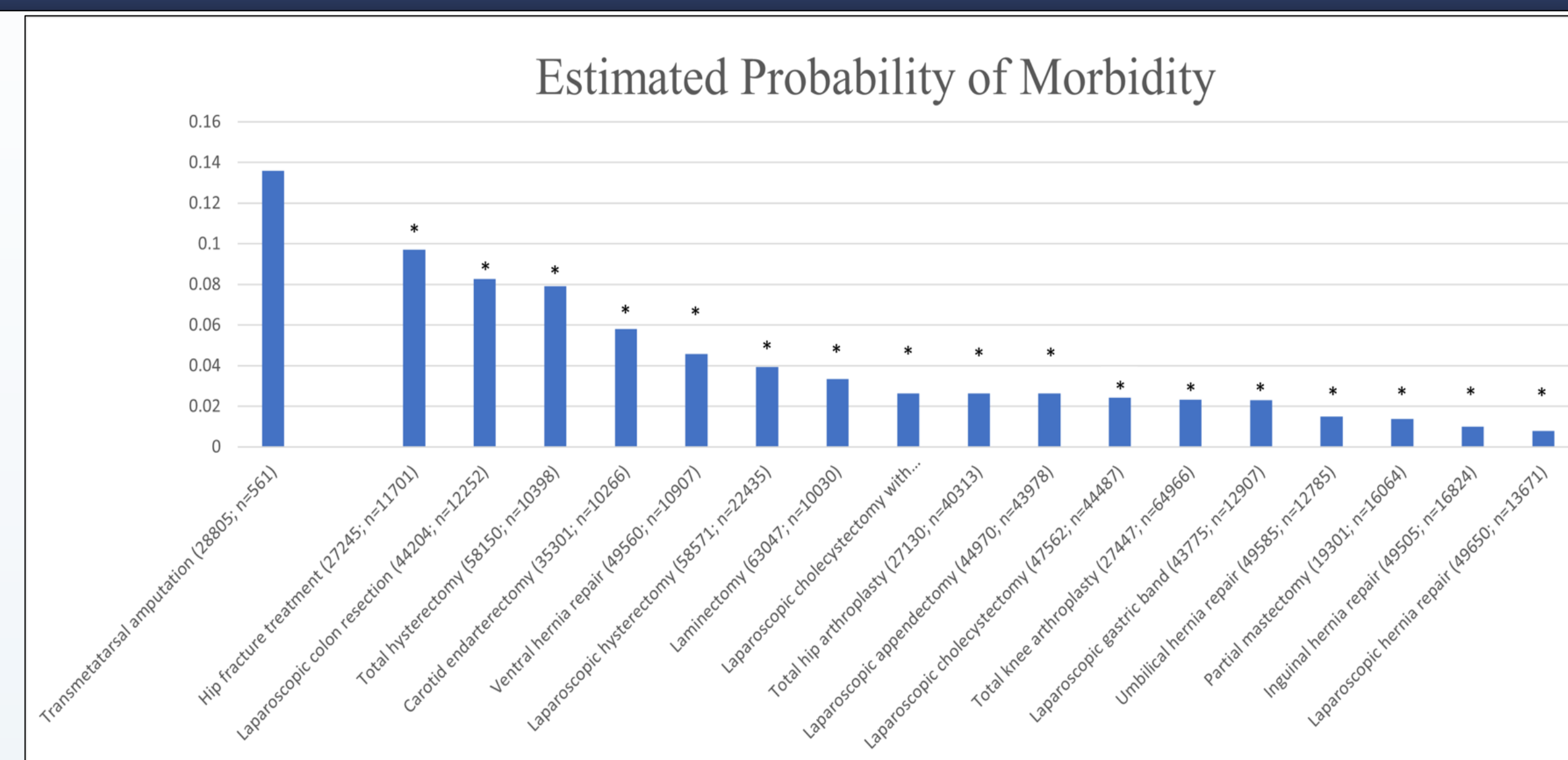


Figure 1 (above) demonstrates a comparison of CPT code 28805 to all other studied procedure codes based on estimated probability of morbidity. CPT code 28805 was associated with the highest estimated probability of mortality of the cohort (0.1360±0.0669). This was statistically higher than all other CPT codes (all comparisons to CPT code 28805 resulted in p<0.001).

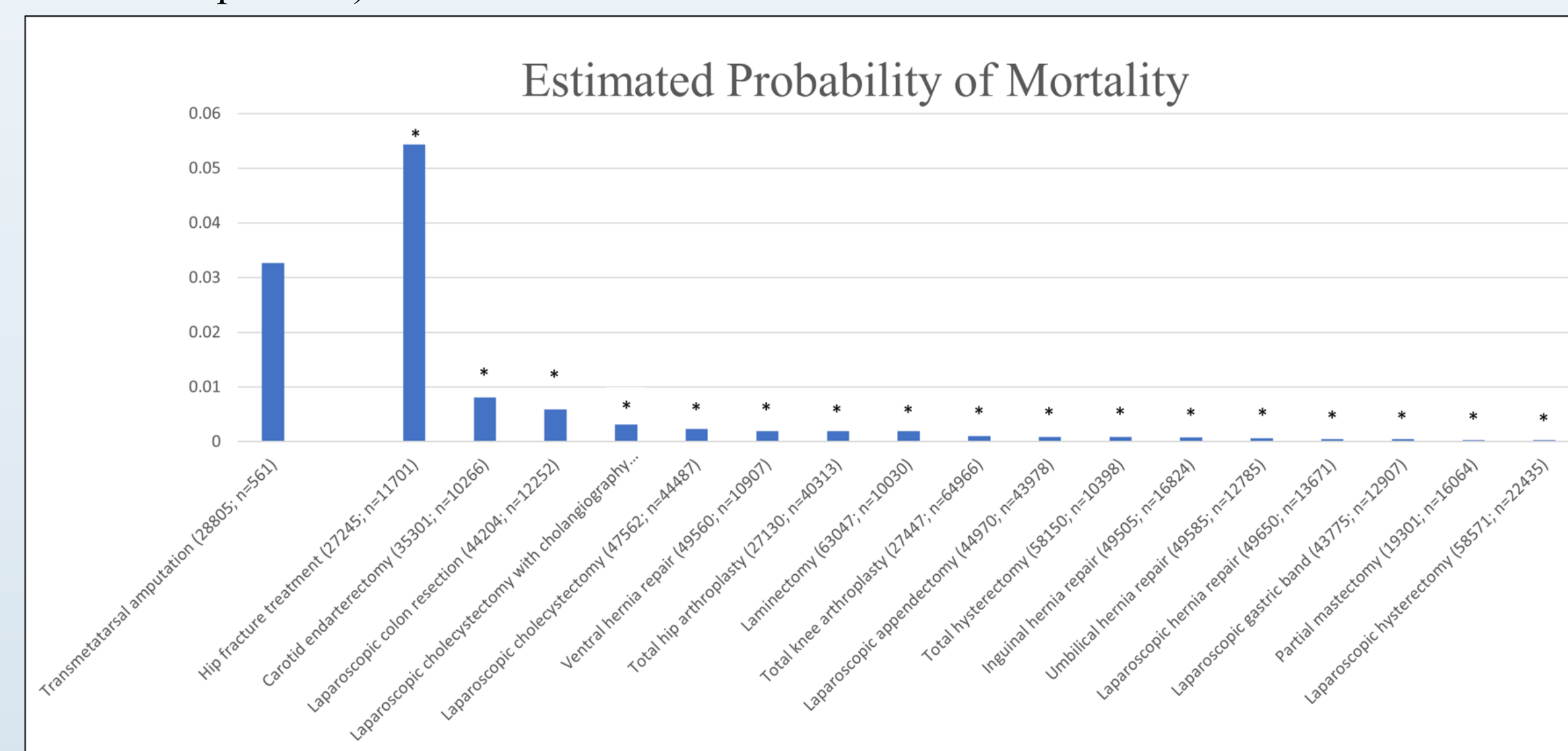


Figure 2 (above) demonstrates a comparison of CPT code 28805 to all other studied procedure codes based on estimated probability of mortality. CPT code 28805 was associated with the second highest estimated probability of mortality of the cohort. This was statistically less than that of CPT code 27245 (0.0327±0.0596 vs. 0.0547±0.0661; p<0.0001), but statistically higher than all other CPT codes (all other comparisons to CPT code 28805 resulted p<0.0001).

Discussion

As with any scientific investigation, critical readers are encouraged to review the study design and specific results in order to reach their own independent conclusions, while the following represents our conclusions based on the specific results. As scientists, we also never consider data to be definitive, but do think that these results are worthy of some attention and future investigation:

-First, these results indicate that the transmetatarsal amputation is a procedure that carries considerable perioperative risk in comparison to other frequently performed surgical procedures. Although perhaps commonly performed for diabetic limb preservation, surgeons should be aware of this substantial morbidity and mortality.

-Second, surgeons are encouraged to actively evaluate their own perioperative practices with respect to this procedure, particularly as it might relate to institution-specific quality improvement/performance improvement initiatives and protocols.

In conclusion, these results from a large national database demonstrate high levels of perioperative morbidity and mortality with the transmetatarsal amputation in comparison to other commonly performed surgical procedures. Although perhaps an accepted standard within diabetic limb preservation, it is likely this procedure requires attention from both a surgical decision making and QI/PI perspective.

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