Reamputation Rate Among Patients at a Large Urban Hospital Quantified as Average Number of Days

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Purpose

Amputations are commonly performed by foot and ankle surgeons and are often complicated by a protracted, unpredictable postoperative course. Much of the existing literature regarding foot amputations focuses on incidence of reamputation, particularly as an overall percentage of how likely reamputation is to occur; however, there is limited data regarding how soon after the first amputation this typically takes place. Therefore, the primary purpose of the present study was to determine the average number of days between foot reamputation for a series of patients seen at our institution. Secondary outcomes of this retrospective study included determining the progression of sequential amputations in the lower extremity, frequency of contralateral amputations, and associated demographic factors.

Methodology

A retrospective review was performed for patients from multiple foot and ankle surgeons at a large teaching institution using CPT billing codes for amputation of toe (28820), partial amputation of bone (28122), and amputation of metatarsal and toe (28810) from December 2014 to July 2017. Outpatient charts and hospital operative records were reviewed to determine dates of operation corresponding with the billing codes and any prior or subsequent lower extremity amputations the patient had undergone falling outside the initial period of data collection were recorded at that time. Upon review of the billing codes, a total of 356 patients were found. Patients were excluded from the study if they did not have at least one consecutive amputation after initial amputation, if they had multiple amputations on the same admission which did not progress in level of amputation, if the date of the amputation could not be verified, or if they underwent incision and drainage, debridement, bone biopsy, or exostectomy only. Of the patients whose billing codes were reviewed, a total of 181 patients met criteria for inclusion into the study who had undergone a total of 564 procedures, 378 of which were consecutive. Time to reamputation rate in the foot was quantified in number of days between subsequent amputations and were averaged for all patients included in the study. Patient demographic information was also recorded and included gender, age, history of tobacco usage, and history of diabetes mellitus.

Results

The average number of days of reamputation was 297.39 days. 89/378 (23.54%) of the amputations occurred within 30 days or less from the initial amputation. 84/378 (22.22%) of the amputations occurred from 31 to 90 days after primary amputation, 48/378 (12.7%) occurred from 91 to 180 days, and 55/378 (14.55%) from 181 days to one year after the first amputation. 102/378 (26.98%) occurred one year or longer after initial amputation. Of the patients in the study, 86.74% were diabetic and 51.38% had history of tobacco use. The mean patient age of patients in the study was 54.03 (range 25-83). Majority were male (74.59%). 43/181 (23.76%) patients progressed from a minor foot amputation to major amputation. Roughly half the patients in the study, 91 (50.2%), had a contralateral amputation performed either after ipsilateral amputation or simultaneously.

Patient Demographic Information	
Percent diabetic	86.74%
Percent tobacco	51.38%
Average age	54.03
Percent male	74.59%
Percent female	25.41%

Table 1: General demographic information collected including percentage of patients with diabetes mellitus, percentage who had a history of tobacco use, average age, and percentage male or female.

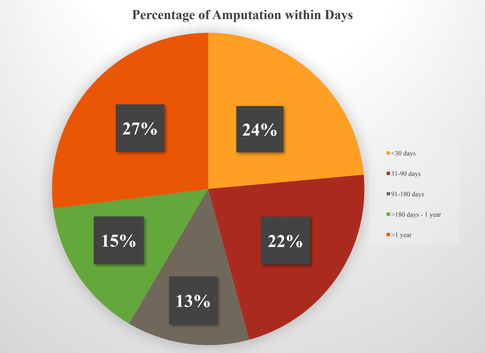

Table 3: Percentage of amputations happening within subsets of time as measured by day

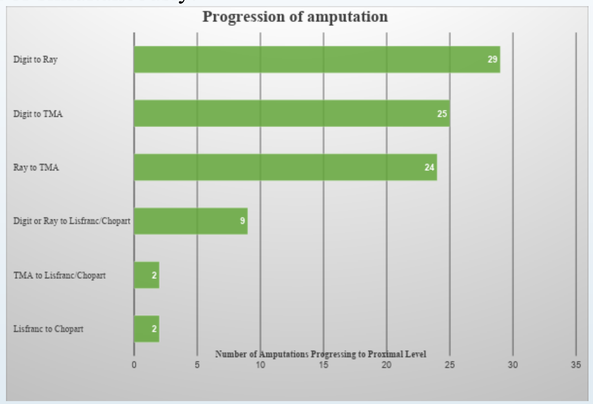

Table 2: Demonstrates the number of progressing amputations as categorized based on level of initial amputation to final level of amputation. Amputations were only included as progressing if they advanced to a proximal level. Amputations such as digit to digit amputation, ray to ray amputation, or ray to digit amputation were not included.

Percent proximal amputation	23.76%
Percent contralateral amputation	50.2%

Table 4: Demonstrates the percentage of patients who had history of a minor amputation and subsequently underwent a major amputation as well as the percentage of patients who had a history of a contralateral amputation being performed after ipsilateral amputation or simultaneously.

Discussion

Our study attempts to determine the average number of days between amputations. This data may be beneficial in providing patients with realistic expectations regarding likelihood of reamputation in patients with history of amputation. The data demonstrates that patients who had foot amputation were most likely to undergo reamputation within the first year following their initial procedure. Specifically, the average number of days was found to be 297.39 days or approximately 9.5 months. This finding differs from other published literature on the topic. Izumi et al. demonstrated in their retrospective study that patients were at the highest risk for undergoing reamputation in the first six months following preliminary amputation.[1] Although foot reamputation and reoperation rates have been studied in the literature, little evidence exists regarding the amount of time which typically elapses between subsequent amputations. Borkosky and Roukis found a 19.8% reamputation rate in neuropathic diabetic patients undergoing a first ray amputation within a mean follow-up period of 26 months; however, failed to elucidate the exact time that these reamputations are most likely to occur.[2] A study by Hosch and colleagues sought to determine outcomes after transmetatarsal amputation and studied the likelihood to reamputate, but only determined the mean number of days until return to shoegear.[3] A systematic review by Thorud et al. studied reamputation rate after transmetatarsal amputation. They noted that 33.2% went on to major amputation, a higher percentage than our study, 23.76%.[4]

Limitations of the study include its retrospective design. Additionally, the study was performed in an urban setting in which social determinants or lack of education regarding disease process may create a barrier to proper care and thus, these findings may not be applicable to those undergoing amputation in suburban or rural settings. Further research should be performed over a longer time period in different patient populations. Additional further area of study includes limiting study period to one year and determining amputation rate within the first year alone to rule out any potential outliers.

References

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