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Flexor Tenotomy For The Treatment Of Hallux Ulcers

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Literature Review

Diabetic foot ulcers are a tremendous health concern, which have been implicated as a causative factor in lower limb amputations. The annual incidence of diabetic foot ulcer (DFU) development in patients with DM is 2% and up to 25% over their lifetime. Regardless of other risk factors, these patients have a greater than 90% likelihood of mortality compared to patients with diabetes without DFU (1,2). Particularly, in the presence of complicating factors such as neuropathy and toe deformities, during weight-bearing or gait, insensitive and deformed toes may be subject to increased pressures and shear stress forces, which can result in formation of callus, tissue trauma, and ultimately ulcerations (3,4).

Throughout the years, research has suggested the flexor tenotomy is a minimally invasive surgical procedure, can reduce healing time as well as the risk of foot ulcer recurrence in patients with diabetes, peripheral neuropathy, and digital deformity or combination of these (5,6). This tenotomy encompasses, for instance, the utilization of the tip of a needle and/or the sharp end of an 18G needle or a #15 scalpel blade through a small incision to transect the longitudinal fibers of the brevis/long flexor tendons, thus reducing the contraction of the flexion deformity of the digit and sequentially relieving pressure at the apex of the toe (7).

The aim of this study was to assess and evaluate the relationship between flexor tenotomies in a clinical setting, and the time course for healing neuropathic, diabetic, and structural deformity hallux ulcers.

Methodology

A retrospective cohort study was performed to analyze the medical files of 1,471 patients treated for digital foot ulcers by flexor tenotomies between September 2011 and January 2019. For the intent of this particular research, focus was directed to the effect of flexor tenotomy on healing time to address hallux ulcers. The medical database of Ankle & Foot Center of Tampa Bay was screened in order to achieve this goal. The dates for procedures, follow-up visits, and wound closures were recorded. The time course for healing was calculated accordingly for all relevant patients, and basic statistical analyses were employed for data interpretation.

During the surgical procedure conducted in a clinical setting, under local anesthesia, the sharp end of an 18G needle or a #15 scalpel blade was used through a single planter incision to release the fibers of the flexor hallucis longus brevis based on surgeon preference. Patients were examined within one week after the procedure performed, and then followed at regular intervals.

A total of 97 patients between the ages of 41 and 86 years of age underwent flexor tenotomy for the treatment of hallux ulcers with a follow up period of 7 months.

Results

The medical database search yielded a total of 1,585 flexor tenotomy procedures, from which 911 (6%) were performed on the hallux, 514 (32%) on the second digit, 487 (32%) on third digit, 375 (23%) on the fourth digit, and 98 (5%) on the fifth digit.

The 97 patients in this study were categorized into diabetic neuropathic ulcers, structural deformity ulcers, and non-diabetic neuropathic ulcers. The total number of female was 46 (48%) and total number of males was 51 (52%). The mean age was 65 years of age. Of the total number of ulcers; the non-diabetic neuropathic group comprised 8%, the structural deformity group comprised 17%, and the diabetic neuropathic group comprised 75%. The mean healing time represented 28 days. The shortest healing time was 5 days, and the longest healing time was 90 days.

Discussion

It has been reported that 84% of diabetic lower limb amputations have been associated with DFU as a causative factor. It is important to remain vigilant for initial immediate and effective treatment with an eye toward the reduction of the development of risks factors such as osteomyelitis and consequential amputation (1).

Following the analysis of the extracted data, our results of using flexor tenotomy for the treatment of hallux ulcers have demonstrated improvement in healing time, as well as suggesting effectiveness of this minimally invasive procedure in an outpatient basis, for the achievement of wound closure and prevention of recurrence in patients with diabetes, neuropathy, and structural digital deformity.

Acknowledgements