Utility of ultrasound in assessment of Dupuytren's and Ledderhose disease and monitoring response to radiotherapy

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Background

Dupuytren's disease is a benign disease involving development of palmar nodules and fascia thickening that progresses to the development of flexion deformities in the fingers. When this disease process affects the feet it is called Ledderhose disease. Conventional treatments (e.g. surgery) for Dupuytren's and Ledderhose disease (DD&LD) are usually reserved for advanced disease to treat contractures and improve function. Another option for treatment is external beam radiation therapy. It has shown utility in preventing progression of disease in DD&LD patients without deformity.

Assessment of DD&LD involves staging based on degree of flexion deformity. Early disease can be difficult to grade, given flexion deformity has not yet developed. Ultrasound imaging of the hands and feet has potential to be useful in the monitoring of early disease and the response to treatment in patients with early disease as it enables detection and measurement of structures under the skin surface.

Figure 2. Simulation markup of patient with clinical and planning target volumes outlined

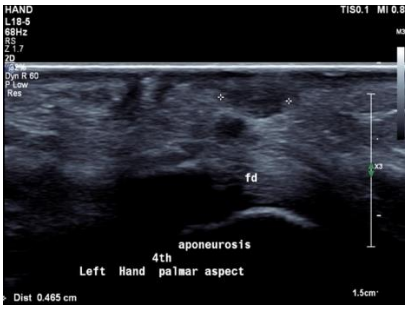

Figure 3. US image of a Dupuytren's nodule

Aim/Method

The aim of this study was to investigate the utility of ultrasound examination of early DD&LD patients in aiding with decision for radiotherapy and monitoring treatment response. Secondary outcome was symptomatic response to radiotherapy.

This study was a retrospective review of patients referred to GenesisCare Gold Coast, Australia for consideration of radiotherapy for DD&LD from 2011 to 2024. Data collected included presenting symptoms, pre-treatment ultrasound, treatment recommendation/details, follow up ultrasound and symptoms. The main treatment regimen was 30 Gray in 10 fractions with a 6-8 week break after the fifth fraction.

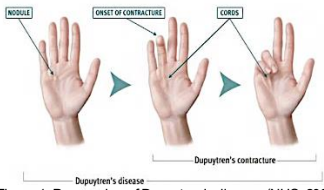

Figure 1. Progression of Dupuytren's disease (NHS, 2024)

Results

As seen in Figure 4, 67 patients were considered for radiotherapy with 55 having pre-treatment US. The average nodule size of patients who were recommended treatment was 18.1mm and the average nodule size of patients who were recommended ongoing monitoring was 11.8mm. This difference in mean size was significant ($p = 0.013$). The relationship between which patients were symptomatic with either pain or movement impairment and nodule size was not significant ($p = 0.06$).

41 patients received treatment to 81 limbs with 39 patients followed up. 35 (90%) reported stable or improved symptoms and 4 (10%) had worsening in symptoms. Out of 23 patients with post-treatment ultrasounds, 29 (83%) limbs showed improvement and 6 (17%) limbs had progression. This meant 18 (78%) patients had US findings consistent with symptoms at follow up, 3 (13%) had inconsistent findings and 2 (8.7%) had indeterminate findings.

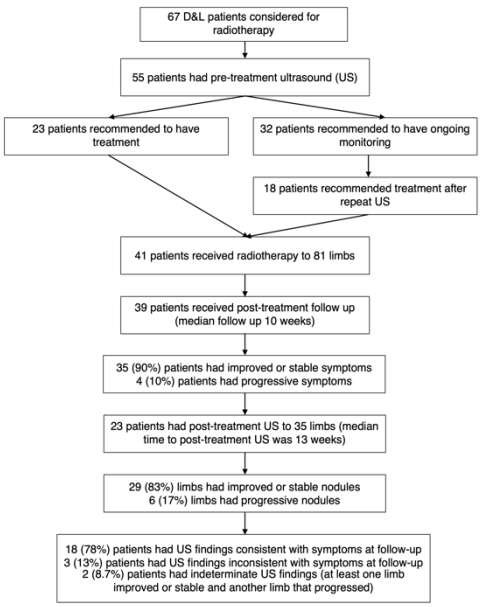

Figure 4. Review process and results

Conclusion

Pre-treatment ultrasound was significantly associated with decision for treatment. Follow up ultrasound was consistent with reported symptoms in 78% of patients. 83% of limbs treated with radiotherapy had stable or improved disease on follow up ultrasound; 90% of patients reported stable or improved symptoms at their last follow up. These findings support the use of ultrasound for selection of patients undergoing radiotherapy and monitoring of treatment response.

1. GenesisCare Tugun/Southport, Gold Coast, QLD, Australia

NHS, 2024. Dupuytren's Disease. Retrieved from https://www.nth.nhs.uk/resources/dupuytrens-disease/