

Computed Tomographic Analysis of Fresh Fractures of the Lunate



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Background

Fractures of the lunate bone are a rare entity that is not well studied. The current classification falls short in classifying all types of encountered fractures. We hypothesize that appreciation of the three dimensional characters of lunate fractures and its correlation with clinical outcomes will lead to the development of a better treatment directed classification.

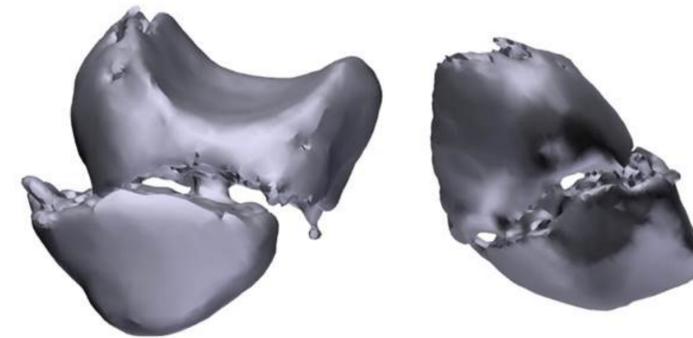
Methods

A retrospective chart review of thirty one patients with lunate fractures was done that were treated at our institution during the period between 2005 and 2015. Patients' demographic characteristics, mechanism of injury, management, outcomes and complications were documented. CT scans were studied and reconstructed using Materialise's Interactive Medical Imaging Control System program (Materialise, Leuven, Belgium) (Fig. 1) and the fracture patterns were studied and classified according to the classification by Teisen and Hjarbaek, then correlated with clinical outcomes.

Results

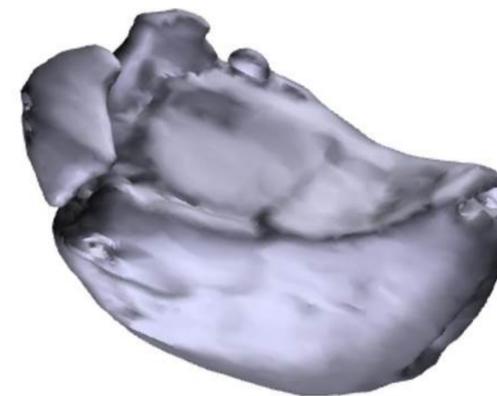
- Twenty seven patients were males and four were females. Average age was 33.6 years. Eleven patients had a low energy trauma and the remaining twenty had a high energy trauma.
- Seventeen (55%) had isolated lunate fractures and fourteen (45%) had associated injuries in the wrist and/or hand. Twenty patients were treated operatively and eleven were treated conservatively.
- Complications noted were avascular necrosis in two patients, non-union in three patients, dorsal intercalated segment instability in four and chronic pain in six.
- By studying the fracture patterns we were able to classify twenty three fractures. Thirteen fractures were type 1, eight were type 3, one was type 4 and one was type 5. Eight fractures were unclassifiable either due to a unique pattern (as shown in figure 2) or due to the complex or combined fracture patterns. The two patients that developed avascular necrosis had an unclassifiable fracture type with volar and dorsal components.

Figure 1



3D reconstruction of a type 4 fracture.

Figure 2



3D reconstruction of an unclassifiable fracture

Conclusions

- We conclude that CT imaging is crucial in diagnosing fractures of the lunate and appreciating the fracture pattern
- Advanced imaging and 3D reconstruction dictate the need for a new classification for lunate fractures to accommodate the newly identified fracture patterns.
- Characteristics of the fracture can aid in determining the prognosis, which was the worst in fractures involving both the volar and dorsal poles according to this study, thus disrupting the blood supply completely and ultimately leading to avascular necrosis.

References

1. Teisen, H., Hjarbaek, J. Classification of fresh fractures of the lunate. *J Hand Surg Br* 1988;13:458-462.