Acute Blunt Temporal Bone Trauma: Maxillofacial vs Temporal Bone CT
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ABSTRACT

Objective: To evaluate the radiographic workup of blunt temporal bone trauma and determine the utility of maxillofacial CT versus temporal bone CT in identifying carotid canal fractures.

Study Design: Retrospective review.

Methods: The charts of 227 patients evaluated at a level I trauma center receiving a temporal bone CT for blunt head trauma within 48 hours of admission were reviewed. Acute evaluation findings and complications were noted. Sensitivity, specificity, PPV and NPV were calculated for maxillofacial CT’s ability to identify carotid canal fractures compared to temporal bone CT.

Results: 140 fractures were found. Physical exam findings of blood in the EAC as the sole finding and blood in the EAC with associated hemotympanum were significantly associated with absence and presence of fracture respectively. The sensitivity and specificity of maxillofacial CT for identifying carotid canal fractures when compared to temporal bone CT were 90.3% and 94.4% respectively (NPV >95%). Only 6% of all patients either did have or should have had their management changed based on the temporal bone CT findings. All of these changes were regarding further work-up for blunt carotid artery injury.

Conclusions: A combination of HCT and physical exam findings allows for judicious decision making regarding the need for a TB CT when no MF CT is indicated. Temporal bone CT’s rarely change acute management. But, when they do, it is in regard to the need for further work-up of possible vascular injury. Lastly, maxillofacial CT’s are adequate for identifying carotid canal fractures.

INTRODUCTION

The utility of a temporal bone CT (TB CT) in the work-up of acute temporal bone trauma has been questioned. An area of much greater debate is how to best evaluate patients with temporal bone trauma for carotid artery injury.

Several facts remain that put the physicians in a precarious situation when working up these patients. 1) No consensus on the appropriate screening guidelines for blunt vascular injury exist 2) Carotid vessel injury can have devastating effects, and thus, a subset of patients should be screened for vascular injury. 3) Patients with fractures of the petrous carotid canal are known to have increased risk of vascular injury. 4) The ability to obtain the most detailed anatomic information is via TB CT.

Thus, TB CT remains a common part of blunt temporal bone trauma work up. No study has directly compared the ability of a Maxillofacial CT (MF CT) to detect carotid canal fractures to the TB CT.

If MF CT is just as good as TB CT, then potentially TB CT’s could be avoided when a MF CT is indicated, leading to a more efficient and cost-effective radiographic work-up of the patient with blunt head trauma.

METHODS AND MATERIALS

Study Design: Retrospective review.

Methods: The charts of 227 patients evaluated at a level I trauma center receiving a temporal bone CT for blunt head trauma within 48 hours of admission were reviewed. Acute evaluation findings and complications were noted. Sensitivity, specificity, PPV and NPV were calculated for maxillofacial CT’s ability to identify carotid canal fractures compared to temporal bone CT.

RESULTS

PE findings and association with temporal bone fracture:
• Blood in the EAC as the only finding on physical exam was common in the no fracture group (18/61, 30%) compared to the fracture group (1/127, <1%). P <0.001.
• The combination of hemotympanum and blood in the EAC was much more common in fracture group (75% vs. 13%, p <0.01).
• No combination of physical exam findings was significantly associated with fractures of the mastoid or tympanic segments of the temporal bone only versus the petrous fracture group.

Table I: Patient Data

| Fractures of the sphenoid only | 61 |
| Fractures of the petrous only | 127 |
| Fractures of the mastoid only | 1 |
| Fractures of the tympanic only | 0 |

Table IV: Carotid Canal Fractures and Angiographic Work-up

| Fractures of the sphenoid only | 61 |
| Fractures of the petrous only | 127 |
| Fractures of the mastoid only | 1 |
| Fractures of the tympanic only | 0 |

CONCLUSIONS

1) MF CT is as good as TB CT in identifying carotid canal fractures.

- Thus, in acute blunt trauma patients where a MF CT is indicated, it appears that no TB CT is needed.

2) Our paper also lends support to the idea that a combination of HCT and physical exam findings does allow for judicious decision making regarding the need for a TB CT when no MF CT is indicated.

3) TB CT’s do not change management often in the acute setting, when they do, it is in regard to need to rule out blunt vascular injury.

Despite the inherent problems associated with the retrospective nature of this review, we feel the findings will aid physicians to make the acute work-up of the blunt trauma patient more cost-effective and efficient without compromising care in a subset of these patients who may need further work-up.

REFERENCES