

The Trauma Ultrasound in the Pre-Hospital Environment (TUPHEn) Study

What are the test characteristics of FAST performed by a road based, pre-hospital trauma response team?

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Background

The accuracy of Focussed Assessment with Sonography in Trauma (FAST) Scans in the pre-hospital setting, may be impacted by numerous environmental factors (including ambient light and vehicle movement), equipment (smaller machines with lower resolution) and the clinician performing the FAST scan.

Objectives

- To describe the test characteristics of FAST performed by a road based, pre-hospital trauma response team
- To compare the performance of paramedics and medical officers performing FAST

Methods

- Retrospective review of Queensland Ambulance Service, High Acuity Response Unit database of patients that received FAST scans in the 2012 and 2014 calendar years and taken to Princess Alexandra and Royal Brisbane and Women's Hospitals.
- FAST findings were compared to a CT, operative findings or sonographer performed ultrasound.
- Time of FAST scan was estimated to be either scene departure time or patient rendezvous time.

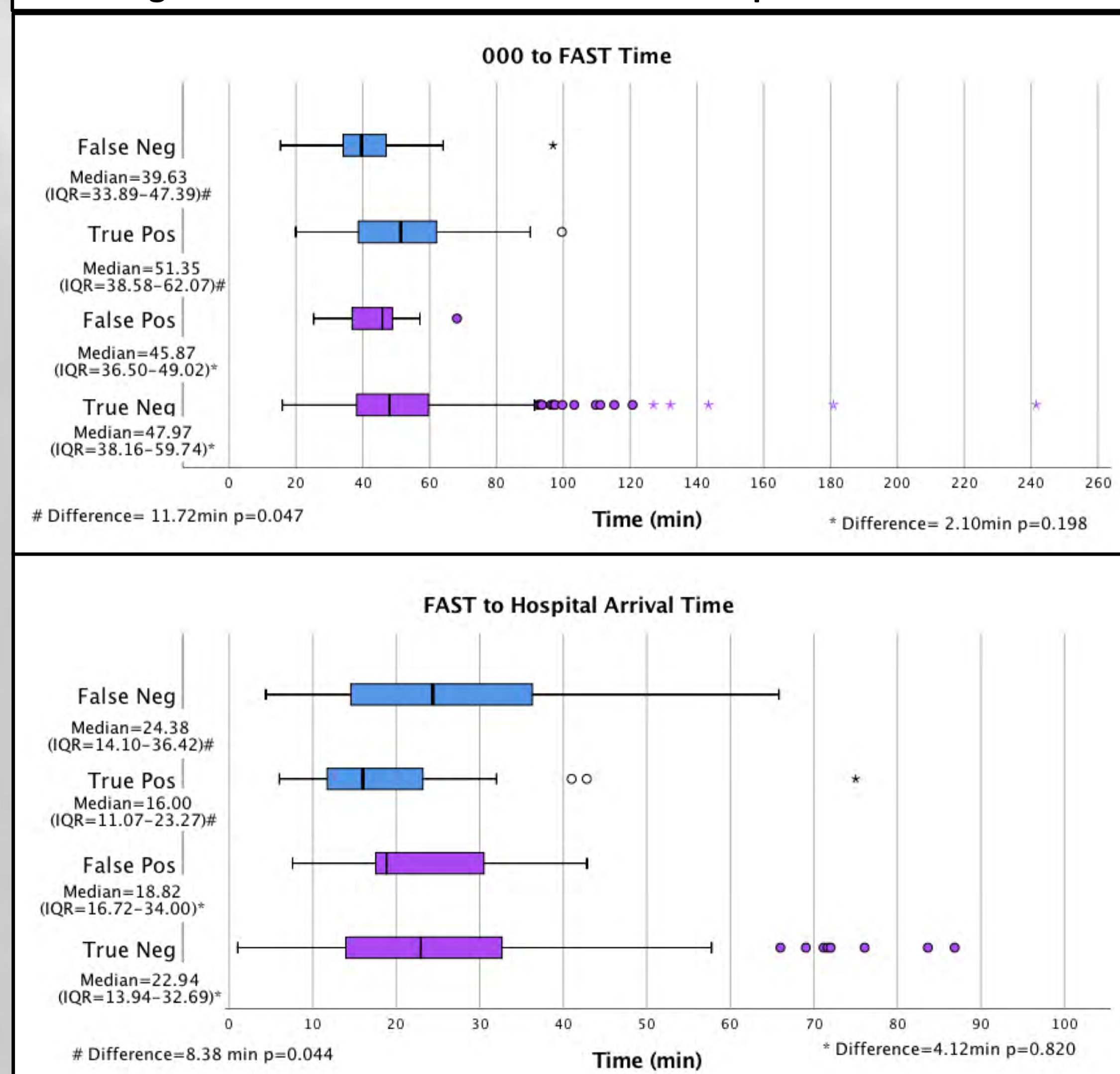
Results

- In total 450 patients included in the analysis
- Majority of patients treated for blunt trauma (n=370, 82.2%)
- Large number treated after hours (n=141, 31.3%)
- Overall and skill set test characteristics shown in Table 1
 - No statistical difference between paramedics and medical officers
- Median 000-Hospital time 71.46 min (IQR: 56.70-89.59min)
 - Median times for 000-FAST and FAST- Hospital significantly different when comparing the true positive to the false negative cohort (see figure 1).
 - No statistical difference in median 000-FAST and FAST-Hospital times between true negative and false positive cohorts (see figure 1).

Overall (95% CI)					
Prevalence of FF:	14.7%	Sensitivity	42.4% (30.3-55.2%)	Specificity	96.9% (94.6-98.4%)
		+LR	13.58 (7.3-25.3)	-LR	0.59 (0.48-0.88)
Skill Sets					
		Paramedics (n=179)	Medical Officers (n=271)	p	
Prevalence of FF:		13.8%	15.1%	0.73	
Sensitivity		32.0% (15.0-53.5)	48.8% (32.8-64.9)	0.18	
Specificity		98.7% (95.4-99.8)	95.7% (92.2-97.9)	0.10	
+LR		24.64 (5.55-109.41)	11.2 (5.62-22.2)		
-LR		0.69 (0.53-0.90)	0.54 (0.40-0.72)		

Table 1: Test Characteristics of FAST. FF= Free fluid, LR= Likelihood ratio

Figure 1: 000 to FAST Time & FAST to Hospital Arrival Time



Conclusions

- Similar test characteristics to studies published in other centres.
- This study demonstrates that with appropriate training and governance, paramedics can achieve similar accuracy in performing FAST to medical officers.
- Sensitivity for free fluid may be influenced by the time between injury and FAST scan as well as the time between FAST and definitive investigation.
- Given its high specificity, pre-hospital FAST is a good tool to activate a hospital trauma system, which would be especially beneficial after hours.

