

Paramedic – Evidence Based Medicine (P-EBP) Program

Paramedic CAT (Critically Appraised Topic) Worksheet

Title: Success Rates Between Tibial and Humeral Intraosseous During Cardiac Arrest

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Clinical Scenario: *Paramedics arrive to a 63 year old male in cardiac arrest whom they are unable to obtain IV access on. Paramedics then reach for their EZ IO gun and decide to go in the tibia as it has been proven to be a more successful site over humerus.*

PICO (Population – Intervention – Comparison – Outcome) Question:

P- Adult, cardiac arrest patients needing intraosseous access

I- success rates of humeral IO insertion

C- vs success rate of tibial IO

O- which route is more successful

Search Strategy:

((intraosseous) OR interosseous) OR IO

((cardiac arrest) OR CA) OR ventricular fibrillation) OR VF

adult

(((((out of hospital) OR pre hospital) OR OOH) OR EMS) OR EMT) OR paramedic
needle insertion sites

((humeral) OR humeral) AND tibia) OR tibial

success rates

EZ IO

Search Outcome:

89



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Relevant Papers:

AUTHOR, DATE	POPULATION: SAMPLE CHARACTERISTICS	DESIGN (LOE)	OUTCOMES	RESULTS	STRENGTHS/ WEAKNESSES
Reades, Rosalyn.	Adults equal to or older than 18. In cardiac arrests of a medical etiology for which resus was attempted	This study was nonrandomized and it was retrospective Level 2, green	Successful attempts at humeral and tibial IOs.	Tibia 84.5% successful overall (89.7% successful first attempt) where humerus was 40% successful overall (34.1% successful first attempt) P value - <0.01	Flaw – Patient weight/size not available. More males than females used in study
Ong, Marcus	Age older than 16 or greater than 40kg and requiring intravenous fluids	Nonrandomized and prospective.	Looking for flow rates and successful IO attempts	No significant difference in tibial or humeral insertion success rates P value - unavailable	Not large group – only 24 participants More tibial than humeral IOs attempted

Comments: Each study looked at several different factors to define a successful attempt including flow rates, dislodgement of needle and ease of access.

Consider: Why would you NOT change practice, based on these articles?

In our practice we currently go for tibial first, I was more curious if that was the most successful placement of an IO needle and it was proven to be just that. Therefore, no need to change practice, as it is already tibial. However all articles were based on using EZ IO guns as we do not yet have access to those prehospitally.



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Clinical Bottom Line: *Tibial IOs have an overall greater success rate over Humeral based on faster flow rates and less dislodgements. It was proven there is no real difference between ease of access.*

References:

Rosalyn Reades, Jonathan R. Studnek, John S. Garrett, Steven Vandeventer & Tom Blackwell. (2011) Comparison of First-Attempt Success Between Tibial and Humeral Intraosseous Insertions During Out-Of-Hospital Cardiac Arrest

Marcus Eng Hock Ong MD, Yiong Hauk Chan PhD, Jen Jen Oh MD, Adeline Su-Yin Ngo MD. (2008) An observational, prospective study comparing tibial and humeral intraosseous access using EZ-IO.

