Humeral Intraosseous Access Success Rate in Adult Out of Hospital Cardiac Arrest

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Introduction

Intraosseous access in the proximal humerus has been demonstrated to deliver high infusion rates with rapid drug delivery to central circulation for the critically ill or injured. Studies demonstrate clinicians can access the proximal humerus with a high degree of success in the classroom or laboratory setting, but literature review offers no studies on paramedic humeral intraosseous success in the out of hospital cardiac arrest patient.

Study Objectives: Identify paramedic success in obtaining humeral intraosseous cannulation during cardio-cerebral resuscitation

Materials and Methods

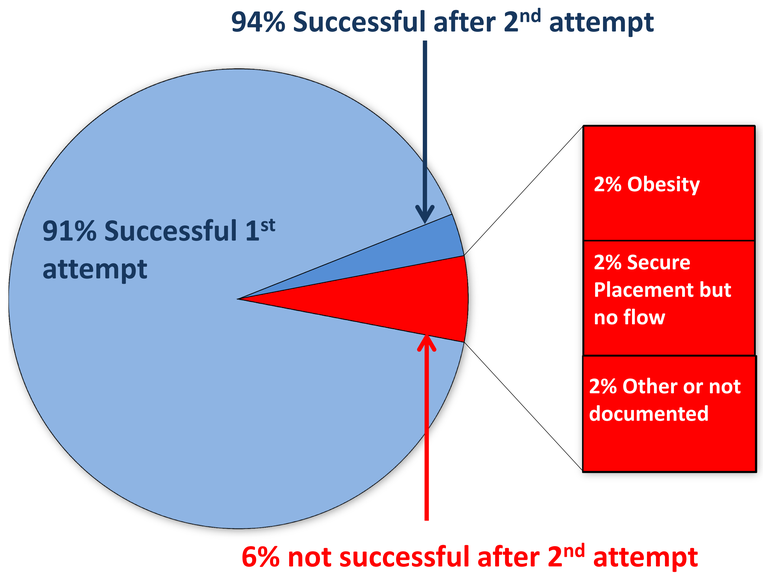
A retrospective cohort analysis was conducted from a cardiac arrest database maintained by the Office of the Medical Director in a large urban EMS system. This data base, a component of a comprehensive Quality Assurance/Quality Improvement, data is collected during post cardiac arrest debriefings for prehospital patient management. Humeral intraosseous access was achieved by paramedics using the EZ-IO device (Vidacare Corporation, San Antonio TX, USA). Clinical staff received comprehensive didactic and hands-on training in humeral access. All cardiac arrest patients during a nine month period were included for data analysis.

Setting

This Study was conducted as a component of a comprehensive quality improvement initiative for the San Antonio (7th largest city in the United States) Fire Department and the Office of the Medical Director. San Antonio Fire Department is a professional system that typically responds to cardiac arrests situations with two dual-paramedic ambulances and a fire apparatus with a crew of four emergency medical technicians.

Results

There were 405 cardiac arrests evaluated with an average age of 63 (+/-16) years and 58% male. Humeral access was attempted in 61% (n=247) of these patients; the balance had either tibial intraosseous, venous or central access. First attempt successful placement (defined as stable placement with sufficient flow) was 91% (n=224 [95%CI 86% to 94%]) with overall success rate of 94% (n=232 [95% CI 90% to 96%]) considering subsequent attempts (max 2 attempts). There were 15 (6%) unsuccessful attempts. There were 4 reports of obesity as the primary reason for non success, 2 reports of stable placement but no flow, and the remaining 9 (4%) were other or undocumented causes of failed attempts. There were also 4 (2%) reports of successful placement with subsequent dislodgement.



Discussion Points

- **Rate of successful IO placement higher than IV insertion**
- **AHA recommends limiting time spent on IV; go to IO access instead**
- **NAEMSP position paper recommends EMS agencies make IO systems available**
- **High flow rates from humeral IO will facilitate iced saline induced therapeutic hypothermia**

Conclusions

This study suggests a high degree of paramedic success in establishing intraosseous access in the out of hospital cardiac arrest patient. Few reported complications suggest humeral IO access is a reliable method of fluid and medication delivery in the out of hospital cardiac arrest population.

Limitations

The limitations of this study are in the need for paramedic self reporting of complications.

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