In infants 6 months of age or younger, tibial IO needle insertion had a 53% failure rate (non-medullary placement)” Harcke et al (2019).

Abstract:

OBJECTIVE: The proximal tibia is a recommended and commonly used site for pediatric emergency intraosseous vascular access (IO). During forensic whole body postmortem computed tomography (PMCT), we evaluated accuracy of emergency placement of tibial IO access.

METHODS: We conducted a retrospective review of 92 state medical examiner cases to assess presence and placement of tibial IO needles. Insertions were classified as successful (needle tip in the medullary portion of the bone) or unsuccessful (all other non-medullary placements) based upon position of the needle tip. Medical records were reviewed for patient age, equipment, and where an insertion was attempted, as well as if IO placement occurred in a prehospital or hospital environment.

RESULTS: Thirty-one cases with 42 tibial devices (aged 3 weeks to 16 years, median 4 months) were identified. In 25 insertions (60%), the needle tip was in satisfactory position. In 17 placements (40%), needle tip was unsatisfactory and included tibia perforation (6), tip embedded in the cortex (6), and needle missed the bone (5). In patients older than 6 months, all six placements of a 15-mm needle were successful. In infants age 6 months or younger, 14 placements (56%) were successful and 11 (44%) unsuccessful. The 25-mm IO needle was
successfully placed in five of six children older than 6 months. In infants age 6 months or younger, the 25-mm needle was unsuccessfully placed in five of five attempts.

CONCLUSION: In infants 6 months of age or younger, tibial IO needle insertion had a 53% failure rate (non-medullary placement). Failures occur during both prehospital and emergency department care. In infants age 6 months or younger, use of a 25-mm needle should be avoided. Procedures for IO insertion in infants age 6 months or younger should be reviewed and modification considered.

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