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*Citation: Power Injection through Ultrasound-Guided Intravenous Lines: Safety and Efficacy Under an Institutional Protocol*

Witting, Michael D. et al. Journal of Emergency Medicine, Volume 52 , Issue 1 , 16 - 22

Clinical question: Is ultrasound guided IV lines as access for high speed contrast injection a safer alternative to traditional peripheral IVs?

Methods: The data were collected in 2 phases: #1 was retrospective collected to evaluate safety and efficacy of power injection in monitored patients including all recorded power IV requests. Additionally records were reviewed for all cases of compartment syndrome requiring fasciotomy from 95 to '13. Phase #2 was prospective to gather further data on refusal for power injection, the reason why and outcomes for both US guided and traditional peripheral IV.

Analysis: primary outcome of interest was the incidence of compartment syndrome related to the injection of contrast through IV lines inserted under ultrasound guidance. The study was powered assuming a 2% incidence, a power of 0.8, and significance of 0.05 requiring a sample of 77 patients.

Results: in phase #1 24 referrals were logged by emergency physicians/CT technicians. The technicians documented 13 refusals: two were for extravasation. One received 10 mL of contrast and the other received an unspecified amount and neither developed compartment syndrome. During that same period, emergency physicians made 14 entries—11 for diagnostic injections plus three rejections by the radiologist. 18 patients were referred for power injection through ultrasound-guided IV lines. Both departments noted 11 of these patients; The Department of Radiology refused four of these patients, all because of infiltration during saline injection.

In phase #2 they found 32 referrals (30 injections) for CT angiography using power injection of contrast in patients with IV lines inserted under ultrasound guidance. In 2010/2011, emergency physicians ordered 1,462 CT angiograms in patients with IV lines established under ultrasound guidance and other methods. 79 of those were with power injection, and a total of 59 cases of compartment were found but none were related to power contrast injection.

Analysis: Compartment syndrome is a very rare complication of IV contrast use. The previous data suggest that extravasation events are not necessarily related to rate of flow (i.e. power injection) and are more related to physiological conditions of the patient. Additionally even in the presence of extravasation compartment syndrome is exceedingly rare. "In three studies with a total of 528,611 patients, 1,612 of them experienced extravasation events, two of whom required surgery for compartment syndrome". That being said, there is still institutional concern for the condition that must be addressed. This study showed that US guided IV line placement increased their efficacy provided the line was tested with a 10 mL test bolus of saline, by up to and estimated 18%.

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