Ultrasound Guided Access for Femoral artery cannulation

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Fluoroscopy vs. traditional guided femoral arterial access and the use of closure devices: a randomized controlled trial.

- 474 patients randomized to FG or TALG access
- The primary endpoint of the study was the angiographic suitability of the puncture site for VCD use.
- Secondary endpoints included arteriotomy location, time and number of attempts needed to obtain access, and the incidence of vascular complications.
- 79.5% fluoroscopy arm and 80.7% traditional arm (P = 0.7) were deemed angiographically suitable for VCD based on the arteriotomy.
- The fluoroscopy group had significantly less arteriotomies below the inferior border of the head of the femur (P = 0.03).
- Total time for sheath insertion (105.7 +/- 130.7 vs. 106.5 +/- 152.6 sec) and number of arterial punctures (1.1 +/- 0.4 vs. 1.1 +/- 0.5) did not differ among the FG and TALG, respectively.
- The rates of vascular complications were not different.

Ultrasound and Central Venous Access

- Real-time 2D US guidance has become the standard of care for placement of central venous catheters and is highly recommended by government agencies.
- Multiple randomized controlled trials and two meta-analyses demonstrated a >50% reduction of accidental arterial puncture, vascular complications (e.g., pneumothorax, or failed access) with ultrasound guidance.
- Ultrasound guidance
  - 46% improvement in first-pass success rates,
  - an average of 1.5 fewer attempts required,
  - time to cannulation was >3 min faster than the traditional landmark technique.

Most trials have focused on the internal jugular vein, but similar results have been observed with subclavian and femoral venous access.

Historical Method: Is it History

- Best Pulse technique

Fluoroscopic guidance

Access parameters of interest

- Time to access: Speed
- Number of attempts
- Correct puncture: Puncture of common femoral artery
- Not having venipuncture
- Complications
  - RPH
  - Pseudoaneurysms
  - Dissections

Results of Randomized Trials

- 208 patients randomized to Ultrasound guided vs. traditional access.
  - The first pass success rate was higher.
  - Total number of attempts required for access lower.
  - Time to sheath insertion were lower in the ultrasound-guided group.
  - Technical success tended to be higher and the complication rates tended to be lower in the ultrasound-guided group but the difference did not reach statistical significance (P = 0.052 and P = 0.052).

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1004 patients randomized
- Compared with fluoroscopic guidance, US guidance produced no difference in CFA cannulation rates (86.4% vs. 83.3%, p = 0.17) except in the subgroup of patients with CFA bifurcations occurring over the femoral head (82.6% vs. 69.8%, p < 0.01).
- US guidance resulted in an improved first-pass success rate (83% vs. 46%, p < 0.0001)
- Reduced number of attempts (1.3 vs. 3.0, p < 0.0001)
- Reduced risk of venipuncture (2.4% vs. 15.8%, p < 0.0001)
- Reduced median time to access (136 s vs. 148 s, p = 0.003).
- Vascular complications occurred in 7 of 503 and 17 of 501 in the US and fluoroscopy groups, respectively (1.4% vs. 3.4%, p = 0.04).
- Related to frequency of hematomas.

**Conclusion**
- Ultrasound guided access is associated with
  - Faster access times statistically
  - More first pass success
  - Less venipuncture
  - Trending toward less complications