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Introduction

- Epidural electrical stimulation test (EEST) or Tsui test is a well-established method for confirming epidural catheter placement
- 90% of obstetric patients with satisfactorily working epidurals have unilateral EEST motor responses even after increased EEST pulse width.
- Color flow doppler (CFD) is another recently described epidural catheter placement confirmatory test

Primary objective

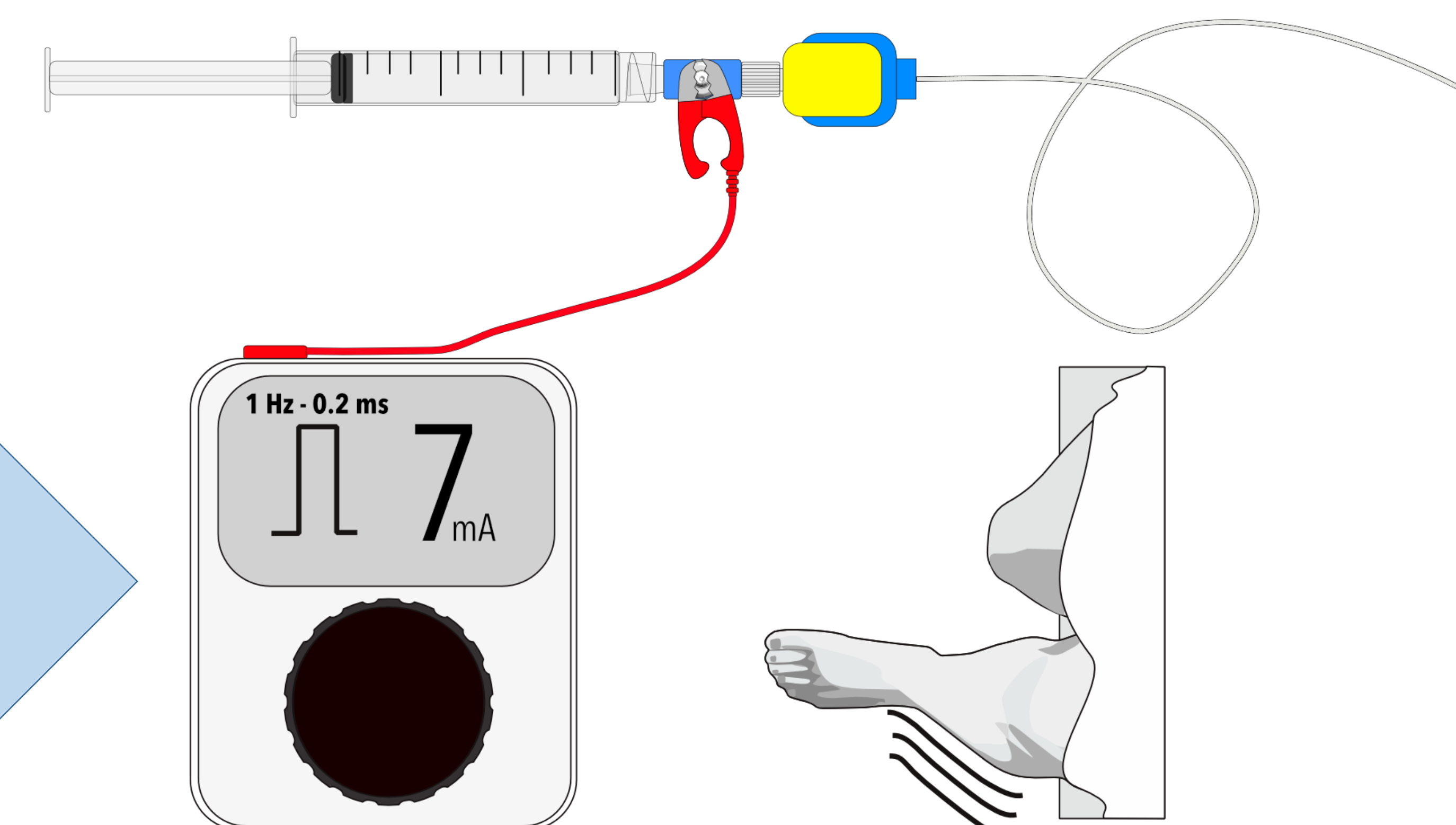
Examine the correlation between EEST response laterality and CFD signal laterality. We hypothesized that EEST laterality would match CFD signal laterality.

Methods

Research Ethics Board approval and written informed consent.
Study design: Prospective observational cohort study.
Population: Patients who delivered vaginally under epidural analgesia.

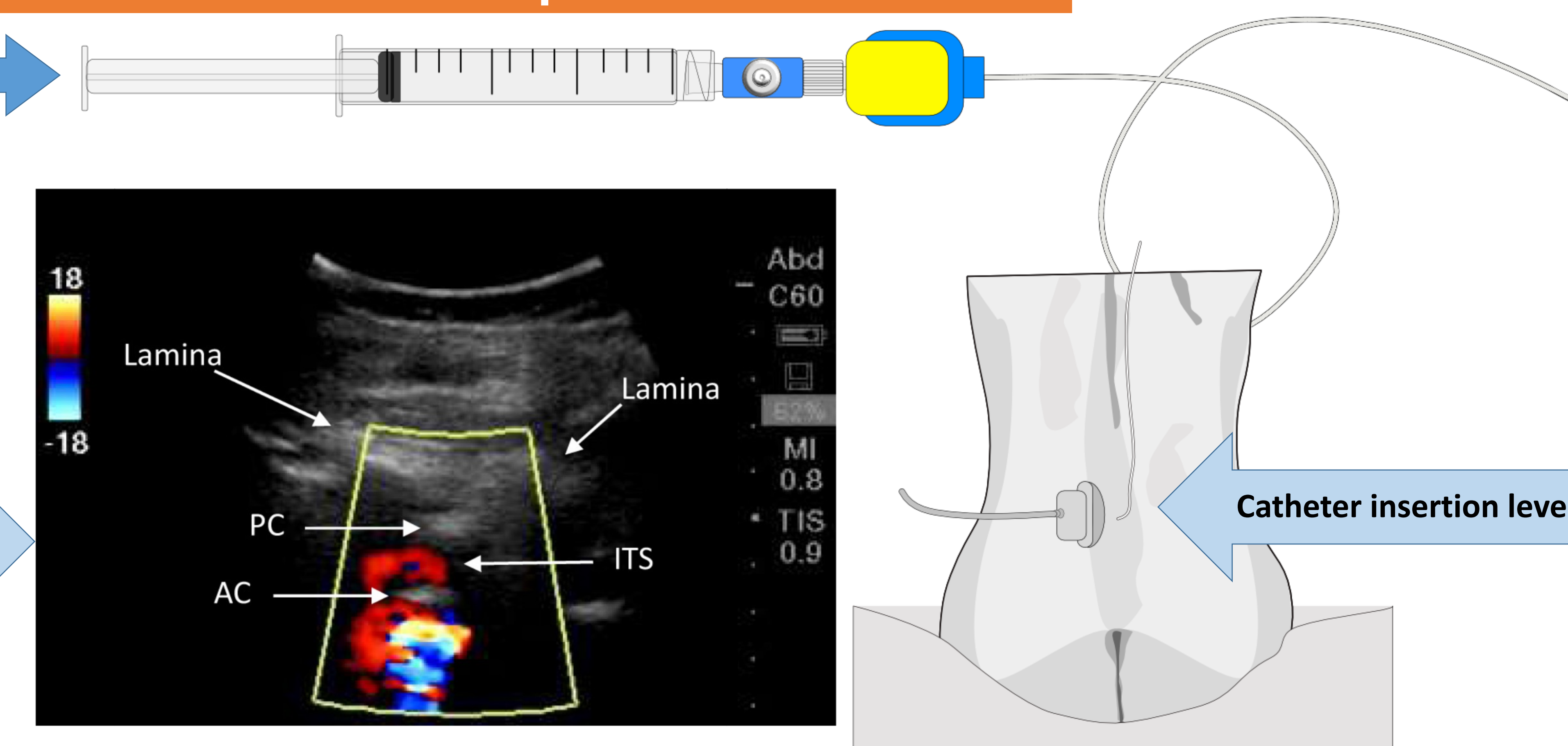
1st Procedure: EEST

EEST was considered positive if a twitch was observed with stimulation current < 20 mA



2nd Procedure: R and L Paramedian oblique CFD to 1 mL NS

Assessment was deemed positive if turbulent flow was observed in the interspace



3rd Procedure: CFD to 3 mL NS bolus IF CFD unilateral

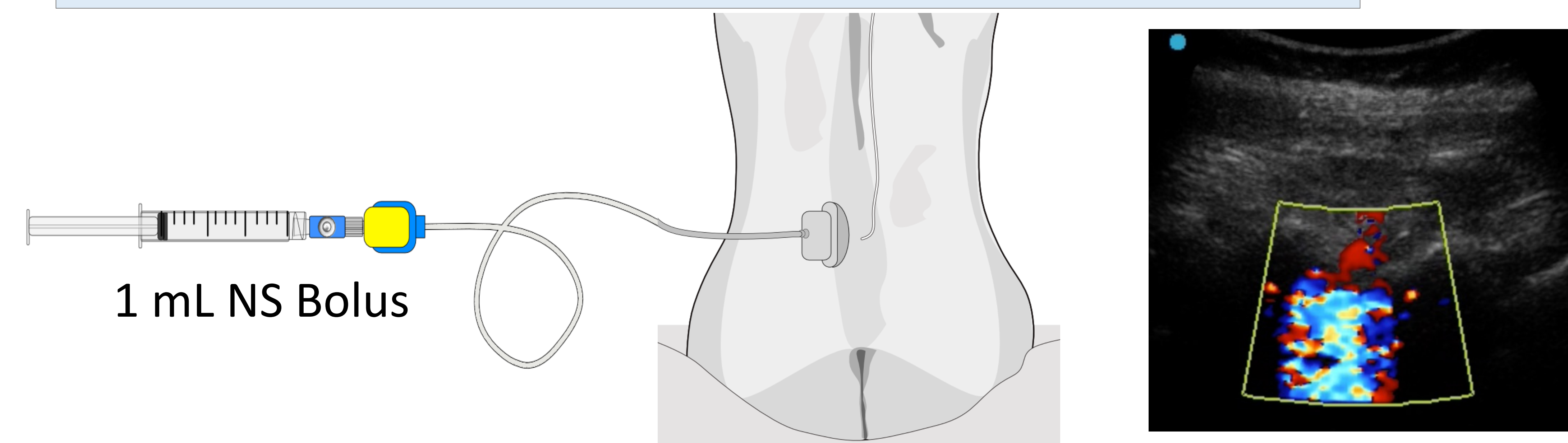
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Results

- 25 patients recruited
- 3 patients excluded because of negative EEST
- No patients required catheter troubleshooting during labor
- All EEST motor responses were unilateral (N=22)

Laterality of CFD compared to laterality of EEST



Bilateral

46%

Contralateral

36%

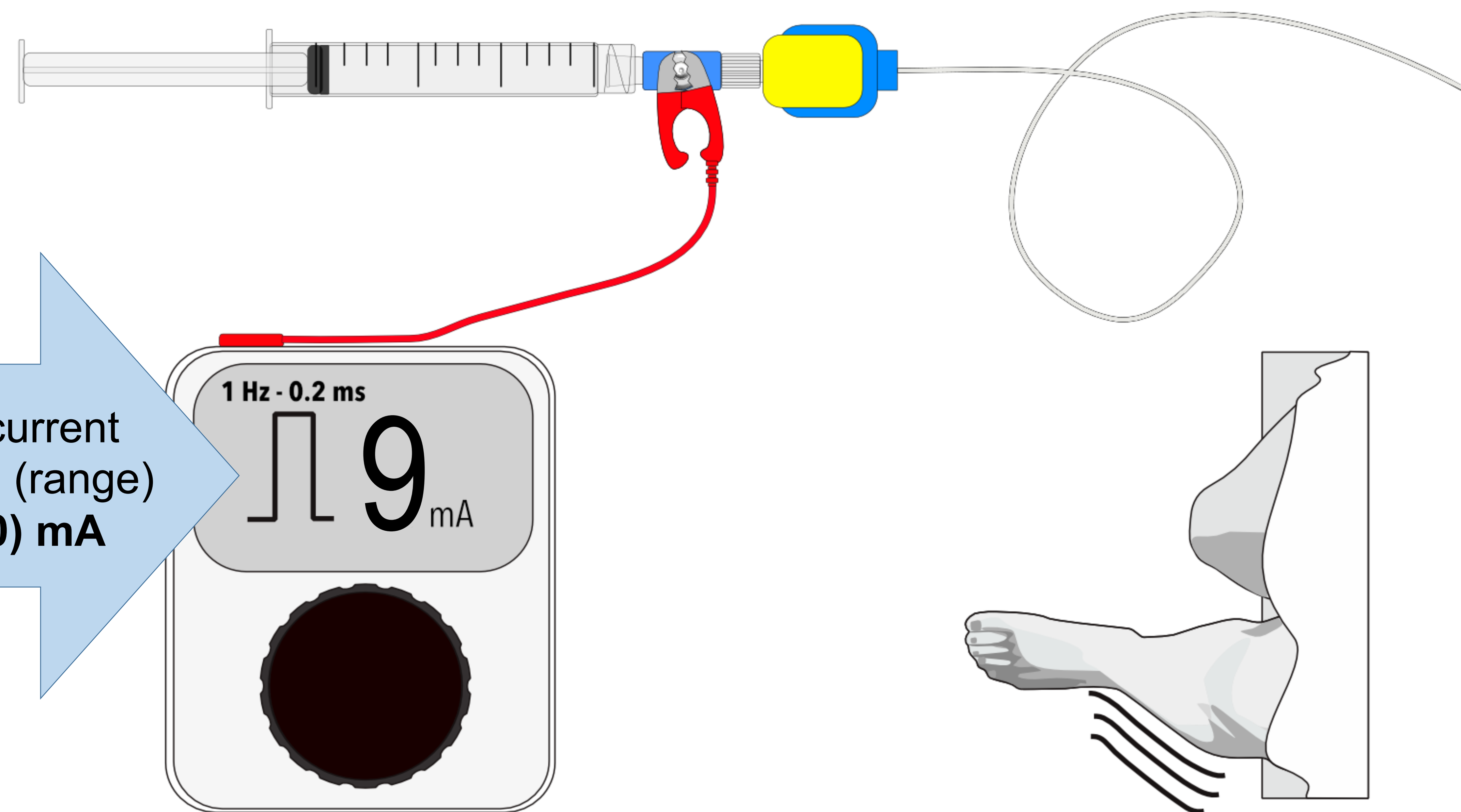
Ipsilateral

18%

+ 3mL
NS Bolus

Bilateral

+14%



EEST current
median (range)
9 (4-20) mA

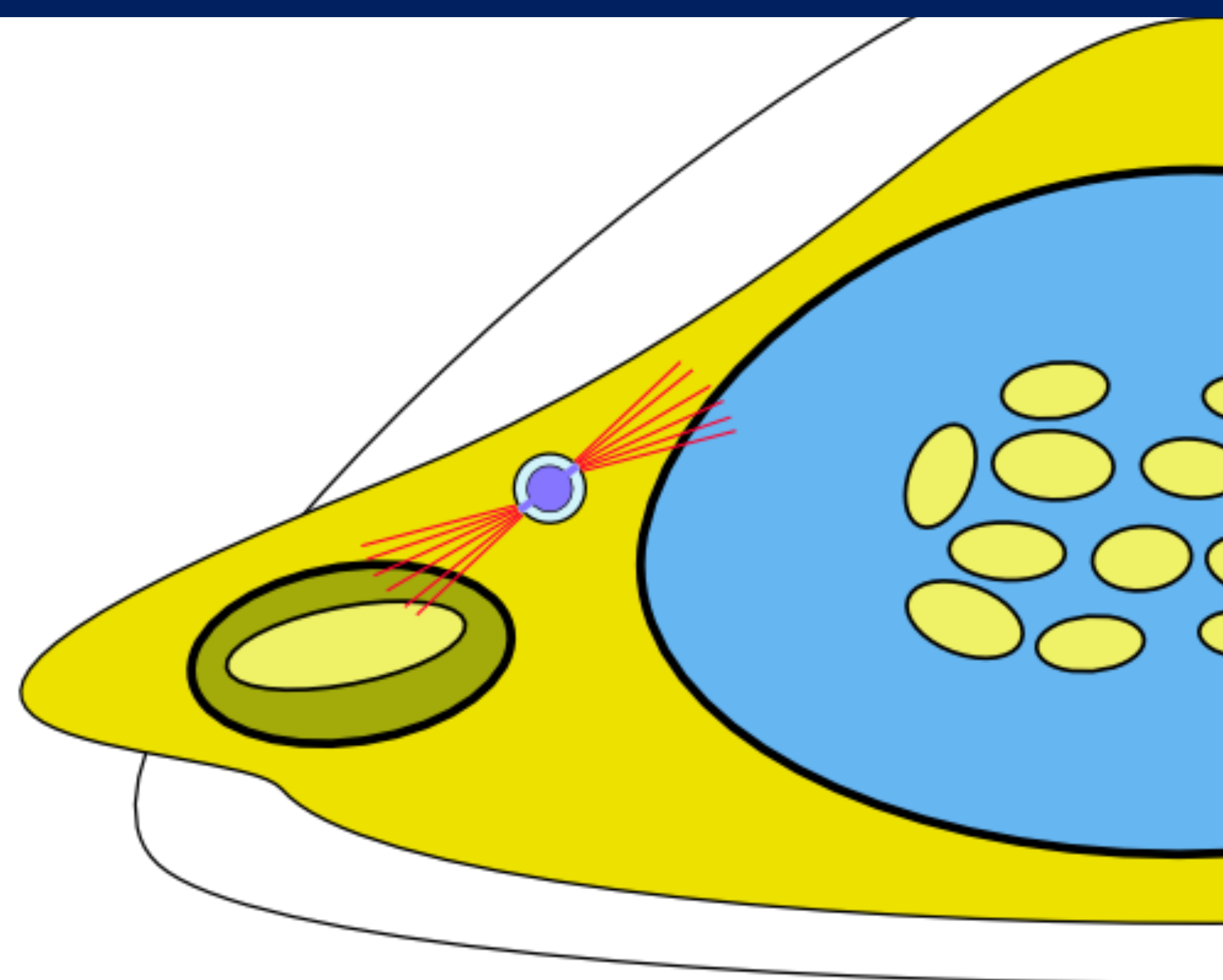
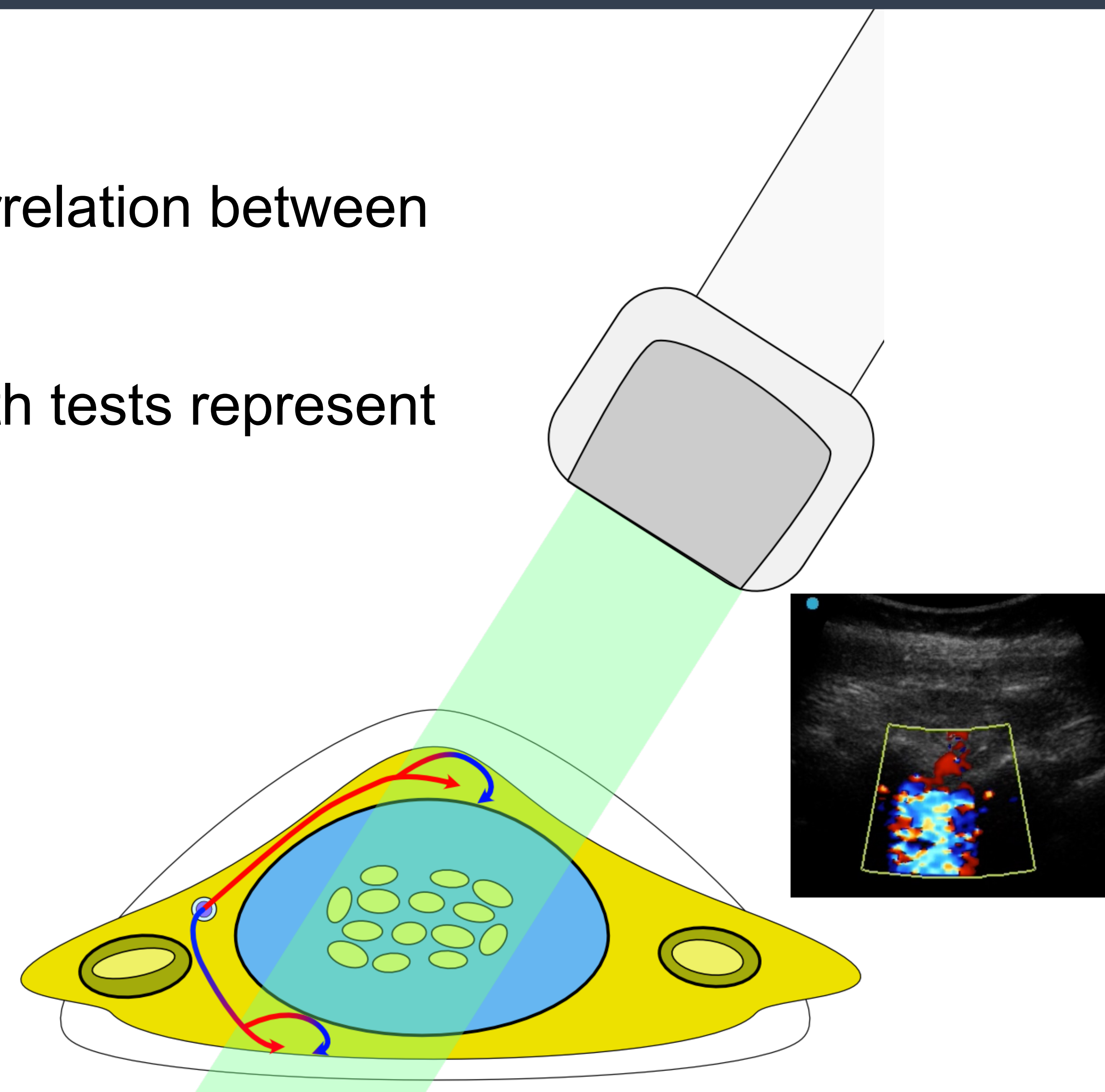
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Discussion

- Our results show that there is no clear correlation between EEST and CFD signal laterality
- This may be explained by the fact that both tests represent different phenomena

EEST works by proximity, as there is an electrical field at the epidural catheter tip that acts as a "monopolar lead", eliciting depolarization in the nearby neural tissues



CFD shows only "flow", hence, it is not necessary to be close to the origin (catheter tip) provided enough pressure/volume is applied at the moment of NS injection. That may explain the fact that increasing volume of injectate increased bilateral CFD signals.

- Assuming all successful labour epidurals had bilateral spread, both EEST and CFD confirmed the epidural catheter presence in the epidural space, but neither showed good correlation with such bilateral spread (EEST 0%; CFD 59%).
- Further research is needed to determine if a volume of epidural solution larger than 3mL can increase the incidence of bilateral CFD detection. If this is the case, CFD should potentially be investigated as a predictor of epidural spread, which would be of clinical significance, given that EEST has already been shown not be useful in that regard.

References

- Margarido CB et al. Can J Anesth 2013;60:393-8
- Zakus et al. Can J Anesth 2017; 64: 1211-1217
- van den Bosch OFC et al. RAPM 2022;47:775-779