New Skills From Drills

Disclosures

- Funding for 2 studies by Vidacare manufactuer of EZ-IO.
- No financial interest in either Vidacare or Teleflex.
- I really like Larry Miller M.D. the inventor of the EZ-IO.

New Skills From Drills

Central Lines vs. IO'S

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It's so cold that...

(Part 2)

What does a central line give you that an IO doesn't?

- High flow. A triple lumen central line can deliver about 3.1 liters per hour.
- Very short central circulation time (under 2 seconds).
- Multiple meds can be given through the same line.

What does a central line give you that an IO doesn't?

- Access for lab drawing.
- Central lines are expensive.
- Central lines are fun.

Let's take these "truisms" one at a time.

Central Lines vs. IO Lines

- "A triple lumen central line can deliver 3.1 liters per hour."
- An IO can deliver 5-7 liters per hour with the humeral approach.

Central Lines vs. IO Lines

- "Central lines have very short central circulation time (under 2 seconds)."
- A humeral IO also has a very short central circulation time (under 2 seconds).

Central Lines vs. IO Lines

- "Central lines can deliver multiple meds through the same line."
- Multiple meds through the same IO line. But, you can start multiple lines, which you should probably be doing anyway.

Central Lines vs. IO Lines

- “Central lines are expensive.”
- It’s a wash, they are, but so are IO’s.
- $507 charged (facility and professional), and $311 collected for both central and IO placement.

Central Lines vs. IO Lines

- "Central lines gives you access for lab drawing."
- Many labs can be drawn through an IO.

Miller LJ, Philbeck TE, Montez DF, Spadaccini CJ.
A new study of intraosseous blood for laboratory analysis.
Arch Pathol Lab Med 2010;134:1253-60

Central Lines vs. IO Lines

- “Central lines are more fun than IO’s.”
- They are.

Plus….

- Central lines take time.
  - Sometimes a lot of time. (studies vs reality)
  - Some patients don't have a lot of time.
- IO's take 10 seconds to start and are ready to go in under 2 minutes.

Leidel BA[1], Kirchhoff C, Bogner V, Braunstein V, Biberthaler P, Kanz KG. Comparison of intraosseous versus central venous vascular access in adults under resuscitation in the emergency department with inaccessible peripheral veins. Resuscitation. 2012 Jan;83(1):40-5

Plus….

- It takes expertise to start a central line.
  - Referral docs may not have that expertise.
- IO's can be trained in less than an hour. Patients can have the benefit of central access for hours before they get to the receiving center.

Plus….

- It is impractical to start a central line in the field.
- Prehospital personnel are experts at IO's.

Plus….

- And, most importantly, **central lines are dangerous. 15% overall complication rate.**
- Mechanical complications include arterial puncture, pneumothorax, hematoma (5-19%) and thrombosis (2-26%).

McGee DC, Gould MK. Preventing complications of central venous catheterization. N Engl J Med. 2003;348:1123–1133

- Especially because they get infected (5-26%)
- 250,000 cases of CVC related infection/yr.
- This costs $34,508-$56,000 per patient, total cost= up to 2.3 billion dollar a year.
- And it kills a lot of people (80,000) and causes a lot of morbidity.

Shannon R.P., Patel B., Cummins D., et al

Economics of central line-associated bloodstream infections.

American Journal of Medical Quality, 2006. Vol. 21, No. 6

Central Lines vs. IO Lines

- Complications from IO's are extremely rare.
- Infections from IO's are essentially unheard of.

Central Lines vs. IO Lines

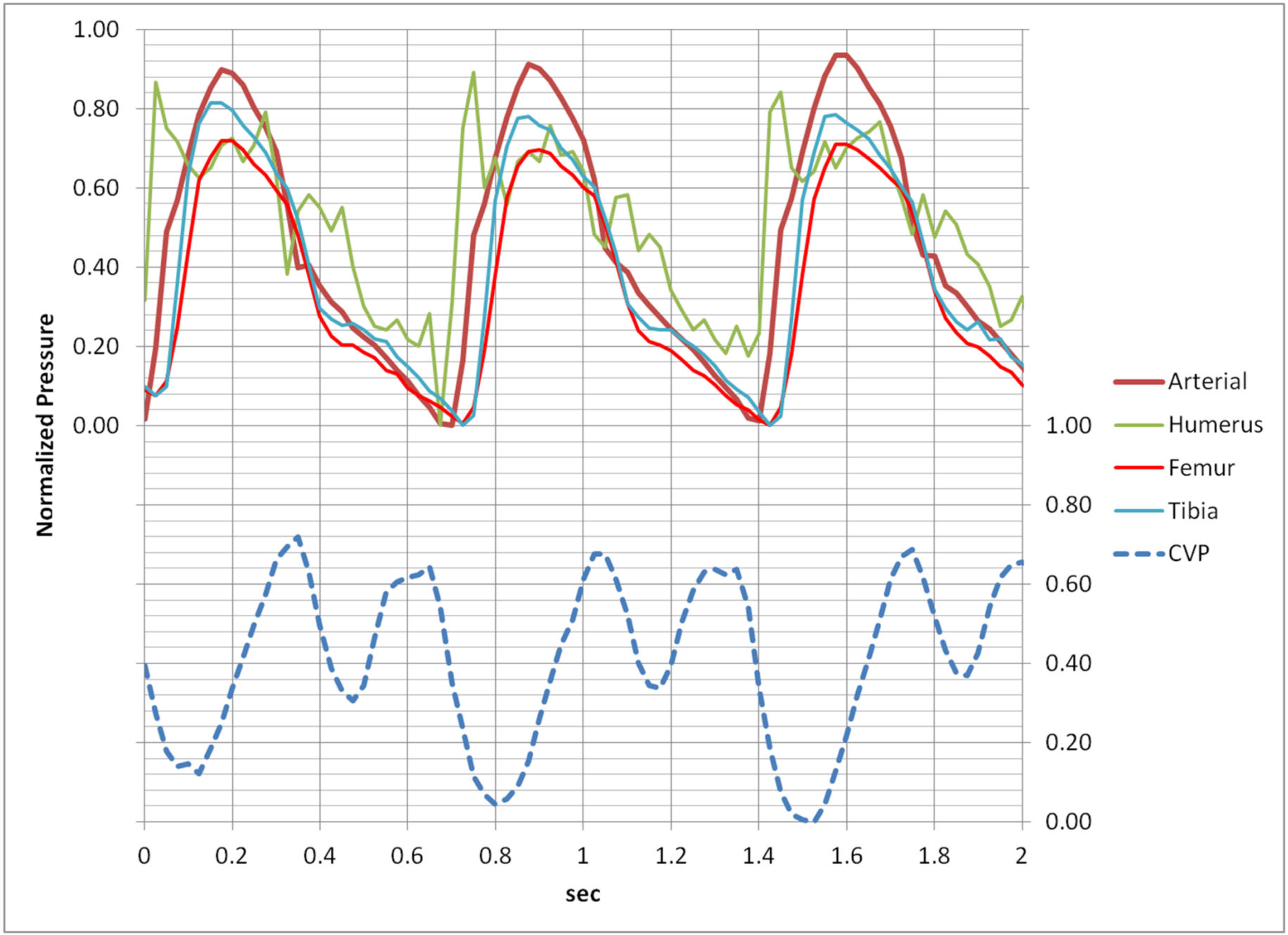
Bottom line: IO's are central lines without all the complications.

So why don't we use them more often?

What can you do with a central line that you can't do with an IO?

You can't monitor through an IO line.

Or, can you?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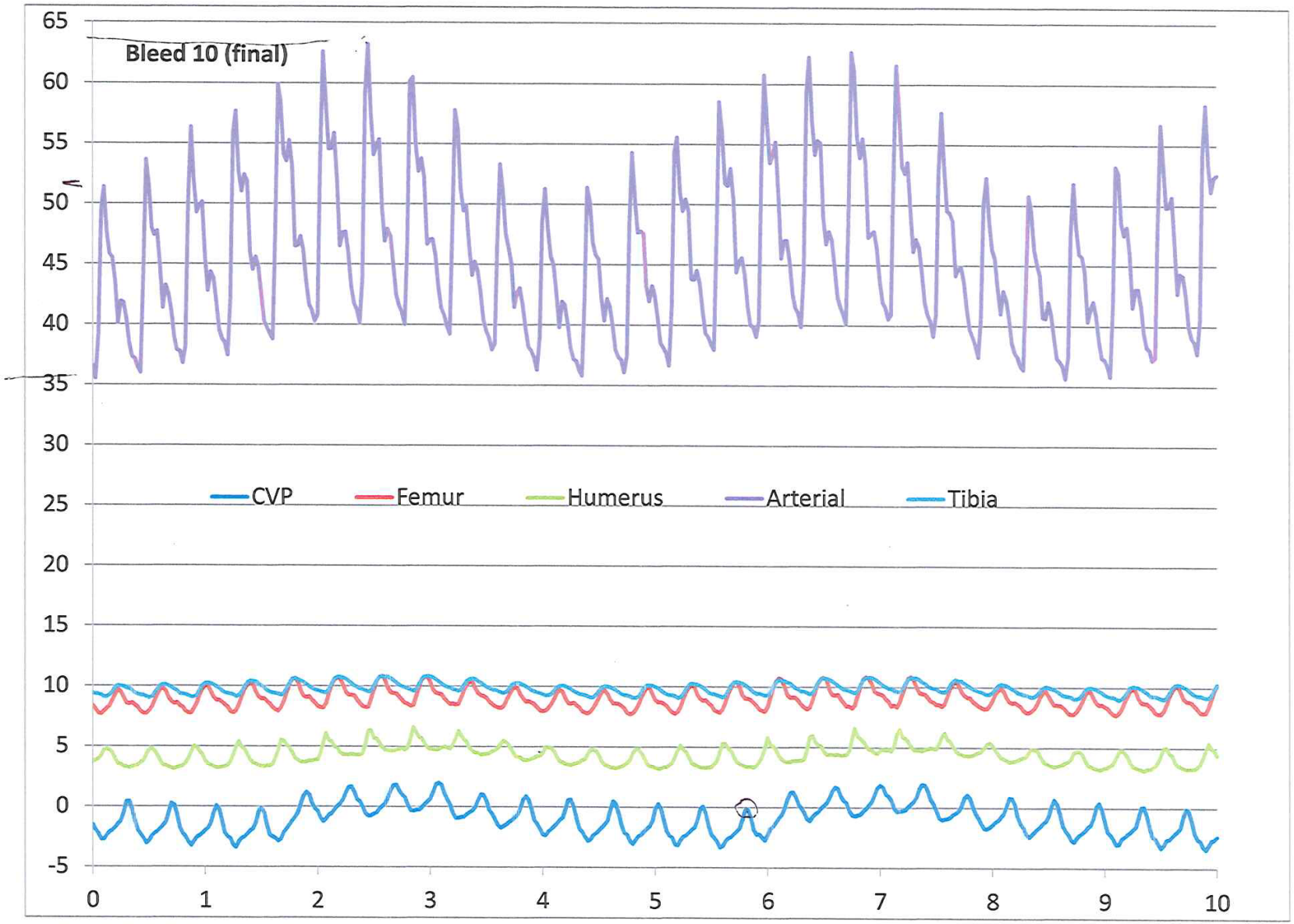
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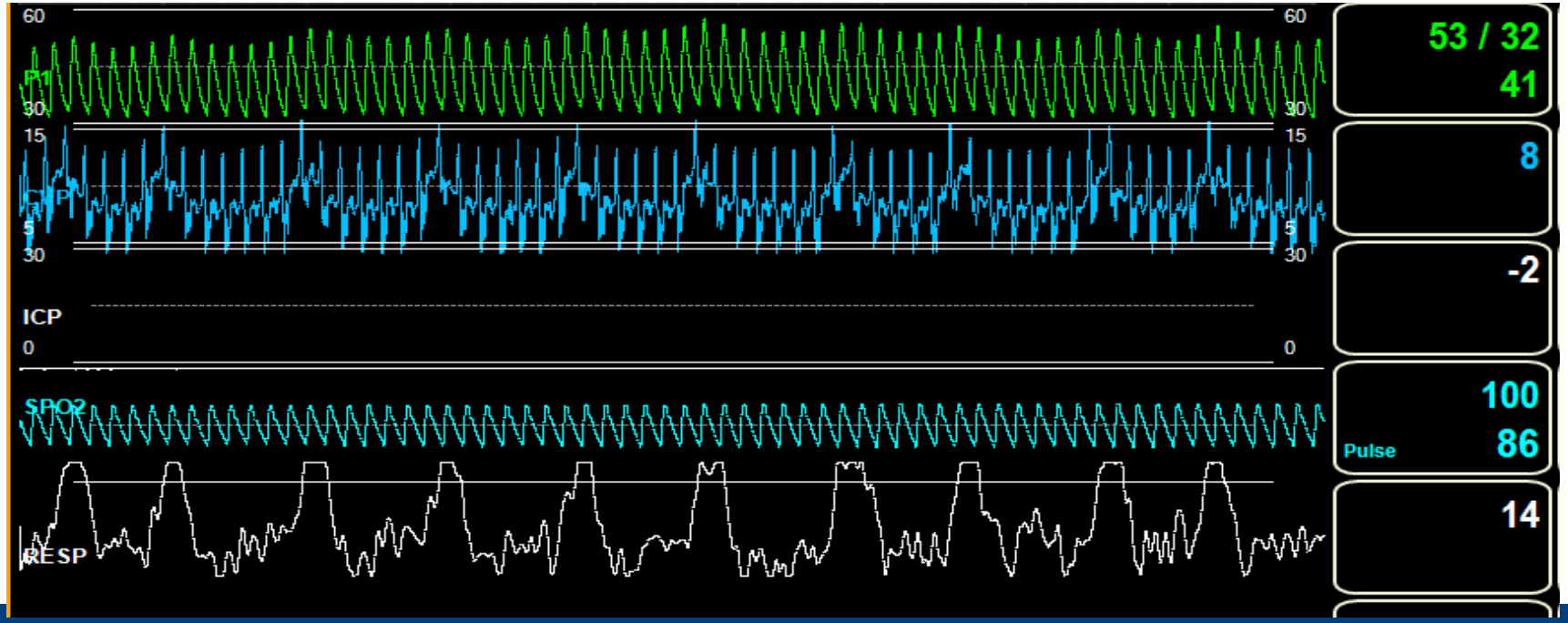
Patient 1: IOP and NIBP Ratios

(2 hours of data)

	Mean CVP / Mean IO	Systolic IO / Systolic NIBP	Diastolic IO / Diastolic NIBP	Mean IO / NIBP MAP
Mean	19%	33%	48%	45%
S.D.	6%	9%	14%	13%



Why could this be important?

- Safer. THEY DON'T GET INFECTED. ALMOST NOBODY DIES FROM THEM (primum non nocere).
- Faster. Under 2 minutes.
- Less skill required. Anyone can do it.
- Earlier monitoring and tx of critically ill patients, especially sepsis with early goal directed therapy.
- They are cheaper, maybe by the billions.
- Fluid status.

Why is this important to EMS?

- Ability to monitor effects of tx (it's at least a poor man's IA).
- Example: Cardiac arrest
  - Is it really PEA?
  - How good is my CPR?
- Research.

Summary

- There is nothing almost nothing that a central line can do that an IO can't, perhaps including monitoring.
- Central lines are dangerous.
- Central lines are funner.
- Or, are they the most funnest?
- Stay tuned, there is more to come with IOP's.

Stay Warm!

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Questions?