Outline

• The IV Drug Use Epidemic
• Current Trends
• Vascular Access Options
Case 1

• 22yo M found in a car with cyanosis and a respiratory rate of 5 breaths per minute
• Pulse is 30 BPM, weak and thready
• Pupils are pinpoint
• EMS attempts IV access but …
Options

• What options exist to establish vascular access in this patient?
• What options exist to treat this patient?
Case 2

- A 35yo female with a history of injection drug use presents with fever and severe back pain to the ED
- She is having difficulty walking and reports an episode of incontinence
- 5 failed traditional PIV attempts
- What are possible choices for short and long term access?
Figure 2.4 Past Month and Past Year Heroin Use among Persons Aged 12 or Older: 2002-2013

+ Difference between this estimate and the 2013 estimate is statistically significant at the .05 level.
Figure 5.2 Past Year Initiates of Specific Illicit Drugs among Persons Aged 12 or Older: 2013

Numbers in Thousands

- Marijuana: 2,427
- Tranquilizers: 1,539
- Ecstasy: 1,180
- Stimulants: 751
- Cocaine: 603
- Inhalants: 601
- LSD: 563
- Heroin: 482
- Sedatives: 169
- PCP: 128

Note: Numbers refer to persons who used a specific drug for the first time in the past year, regardless of whether initiation of other drug use occurred prior to the past year.
Figure 5.3 Mean Age at First Use for Specific Illicit Drugs among Past Year Initiates Aged 12 to 49: 2013
OxyContin® CII
(oxycodone hydrochloride controlled-release) tablets
10 mg
100 Tablets
Rx Only
Purdue Pharma L.P.
Two Pieces of Literature

• 1980 - 100 word letter to the NEJM describing how use of narcotics for cancer pain in end-of-life patients was safe and did not lead to long term addiction.

• 1986 - A case series of 38 patients published in Pain that in the short term with carefully selected patients narcotics can be used for non-cancer pain safely.
The Joint Commission

• Issued pain management standards in 2001
• Organized a pain management educational program that was partially funded by … Purdue.
• Federation of State Medical Boards reportedly accepted money from pharma to produce and distribute narcotic prescribing guidelines
Figure 2.16 Source Where Pain Relievers Were Obtained for Most Recent Nonmedical Use among Past Year Users Aged 12 or Older: 2012-2013

Source Where User Obtained

- More than One Doctor (2.6%)
- One Doctor (21.2%)
- Other¹ (4.3%)
- Bought on Internet (0.1%)
- Drug Dealer/Stranger (4.3%)
- Bought/Took from Friend/Relative (14.6%)

Source Where Friend/Relative Obtained

- One Doctor (83.8%)
- More than One Doctor (3.3%)
- Free from Friend/Relative (5.1%)
- Bought/Took from Friend/Relative (4.9%)
- Drug Dealer/Stranger (1.4%)
- Other¹ (1.2%)
- Bought on Internet (0.3%)

¹The Other category includes the sources "Wrote Fake Prescription," "Stole from Doctor's Office/Clinic/Hospital/Pharmacy," and "Some Other Way."

Note: The percentages do not add to 100 percent due to rounding.
Figure 7.2 Specific Illicit Drug Dependence or Abuse in the Past Year among Persons Aged 12 or Older: 2013

- Marijuana: 4,206 thousand
- Pain Relievers: 1,879 thousand
- Cocaine: 855 thousand
- Heroin: 517 thousand
- Stimulants: 469 thousand
- Tranquilizers: 423 thousand
- Hallucinogens: 277 thousand
- Inhalants: 132 thousand
- Sedatives: 99 thousand

Numbers in Thousands
Backlash

• Justice Department, FDA and Senate Finance Committee investigates
• 2007 Purdue pleads guilty to misleading the FDA, doctors and patients about risk of Oxycontin
• 2010 Purdue reformulates Oxycontin
• 2014 Chicago sued five pharma companies for pushing consumer use of opiates, causing addition and costs
Figure 2.4 Past Month and Past Year Heroin Use among Persons Aged 12 or Older: 2002-2013

+ Difference between this estimate and the 2013 estimate is statistically significant at the .05 level.
Not all injection = IV

- Subcutaneous injection – “Skin popping”
- Intramuscular injection – “Muscling”
- Intravenous injection – “Main lining”, “Shooting up”, “Pinning”, “Jacking up”, “Banging” and “Slamming”
- Users may evolve to different sites and types

@jmatthewfields
Most Common Drugs Injected

- Heroin
- Cocaine
- Crystal Methamphetamines
- Amphetamines
- Opiates/Prescription Drugs
Complications

• Vascular Injury
  – “Collapsed Veins”
  – Chronic Venous Disease
  – Thrombosis

• Infection
  – Skin & Soft Tissue (Cellulitis / Abscess)
  – Endocarditis, Osteomyelitis, Epidural Abscess
  – HIV, Hep B & C
Collapsed Veins

- Scarring
- Repeated Use of same vein
- Bad needles (blunt)
- Improper Technique, “Digging”
- Injection of caustic substances

@jmatthewfields
Chronic Venous Disease

Clinical Classifications

- Varicose Veins
- Swelling
- Skin Changes
- Ulcer

Photos courtesy of Rajabrat Sarker, MD, PhD.

@jmatthewfields
Thrombophlebitis
Cellulitis / Abscess
Injection Drug Use = Difficult Veins

**Table 2**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Adjusted OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes</td>
<td>2.1</td>
<td>1.3-3.4</td>
</tr>
<tr>
<td>IVDA</td>
<td>2.4</td>
<td>1.1-5.3</td>
</tr>
<tr>
<td>SCD</td>
<td>3.5</td>
<td>1.4-8.4</td>
</tr>
</tbody>
</table>

- Options:
  - EJ or Ultrasound Guided PIV
  - Central Venous Access
  - Intra-osseus

@jmatthewfields
Central Venous Access

• Common Sites
  – Internal Jugular
  – Subclavian/ Axillary
  – Femoral
# CVC Complications

<table>
<thead>
<tr>
<th>Complication</th>
<th>Internal Jugular</th>
<th>Subclavian</th>
<th>Femoral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arterial puncture</td>
<td>6.3–9.4</td>
<td>3.1–4.9</td>
<td>9.0–15.0</td>
</tr>
<tr>
<td>Hematoma</td>
<td>&lt;0.1–2.2</td>
<td>1.2–2.1</td>
<td>3.8–4.4</td>
</tr>
<tr>
<td>Hemothorax</td>
<td>NA</td>
<td>0.4–0.6</td>
<td>NA</td>
</tr>
<tr>
<td>Pneumothorax</td>
<td>&lt;0.1–0.2</td>
<td>1.5–3.1</td>
<td>NA</td>
</tr>
<tr>
<td>Total</td>
<td>6.3–11.8</td>
<td>6.2–10.7</td>
<td>12.8–19.4</td>
</tr>
</tbody>
</table>

* Data are from Merrer et al., Sznajder et al., Mansfield et al., Martin et al., Durbec et al., and Timsit et al. NA denotes not applicable.
USGIVs = a game changer

Ultrasound-Guided Peripheral Intravenous Access Program Is Associated With a Marked Reduction in Central Venous Catheter Use in Noncritically Ill Emergency Department Patients

Hamid Shokoohi, MD, MPH, RDMS, RDCS; Keith Boniface, MD, RDMS, RDCS; Melissa McCarthy, ScD;
Tareq Khedir Al-tiae, MD; Mehdi Sattarian, MD, MBA; Ru Ding, MS; Yiju Teresa Liu, MD, RDMS;
Ali Bourmand, MD, MPH, RDMS; Elizabeth Schoenfeld, MD, RDMS; James Scott, MD; Robert Shearer, MD;

80% REDUCTION

Department of Emergency Medicine, Thomas Jefferson University, Philadelphia, PA 19107, USA

Jefferson Medical College, Thomas Jefferson University, Philadelphia, PA 19107, USA

@jmatthewfields

INS NOT 2015
National Academy of Infusion Therapy
Dallas, TX November 6-8
USGIV Placement

@jmatthewfields
USGIVs – How I do it.

1. Tourniquet
2. Scan the arm, forearm & AC
3. Cephalic is a nice target if present
4. Forearm > AC > Arm
5. < 1 cm deep (if deeper get a midline)
6. Avoid veins in a NV bundle

@jmatthewfields
Example Vessels
Nerves

@jmatthewfields
Make a circle with the needle
A less than ideal USGIV
Floating the catheter

@jmatthewfields
External Jugular
External Jugular

ULTRASOUND-GUIDED PERIPHERAL VENOUS ACCESS VS. THE EXTERNAL JUGULAR VEIN AS THE INITIAL APPROACH TO THE PATIENT WITH DIFFICULT VASCULAR ACCESS

Thomas G. Costantino, MD, Jeremy F. Kirtz, MD, and Wayne A. Satz, MD

Department of Emergency Medicine, Temple University School of Medicine, Philadelphia, Pennsylvania

Reprint Address: Thomas Costantino, MD, Department of Emergency Medicine, Temple University School of Medicine, 10th Floor, Jones Hall, 1316 W. Ontario Street, Philadelphia, PA 19140

USGIV 84% Success
EJ 50% Success
Intra-osseous

- First used in 1934
- Replaced by IV catheter
- Rediscovered in 1980s
- Reaches central circulation in < 1 second
Intra-osseous
Intra-osseous Access

• May be left in place 72-96 hours
• Most medications
• Contraindicated in fractures, previously used site, bone conditions, overlying infection
• Potential complications: infection, compartment syndrome (due to extravasation), hematoma, pain, fat embolus
Avoid Vascular Access
Can medications be given orally?

- Many antibiotics can be given orally
- Heparin? → Lovenox
- IV Pain meds → Oral equivalents or IM
An at risk group

- Higher rates of AMA
- Addiction
- Stigmatization
- Risk to providers
- Higher mortality when leaving AMA
Can injection drug users go home with IV access?

Ho et al – case series of 29 patients safely treated in an outpatient parental antibiotic treatment program with PICC lines

No deaths, 6 readmissions
Midlines

- Nice alternative
- 28 day dwell time
- Similar to USGIV placement

@jmatthewfields
Case 1 Follow-up

• A nearly dying patient with inability to obtain IV access
• Next step?
  – Intranasal Naloxone
  – USGIV
  – CVC
  – Intra-osseous
Case 1 Follow-up

• Narcan given – no effect
• En route to ED pt goes into PEA arrest
• In the ED IV access not obtainable and IO placed
• ACLS provided and patient has return of spontaneous circulation
Case 1 Follow-up

- IJ central line placed for ongoing access
- The patient recovers after 3 days in the ICU
- Signs out AMA
Why didn’t narcan work?

- Patient had heroin which tested positive for Fentanyl
- Requires 2-3x usual Naloxone dosing
Case 2 Follow-up

• Young female clinically stable with concern for epidural abscess

• Short term options:
  – USGIV
  – CVC
  – Intra-osseous
  – No vascular access
Case 2 Follow-up

• Team went for no vascular access as IV access wasn’t critical
• PO Tylenol for fever
• MRI
• After USG IV placed
• PICC line and skilled nursing facility
Consider Team Approach

Providers (physician/nurse)

Patient

Vascular Team

@jmatthewfields
Summary

• Injection drug use is an epidemic
• Many complications
• Ultrasound guided IV use should be expanded to reduce CVCs
• Consider a team approach to short term and long term access


Questions?