Offsite Anesthesia

Presented by:

Rebecca Sullivan DNAP, CRNA

1

Objectives

- Discuss the responsibilities of an anesthesia provider to perform a safe anesthetic out of the operating room
- Discuss preparedness of anesthesia provider for patient and own protection when administering anesthesia in remote locations

2

NORA

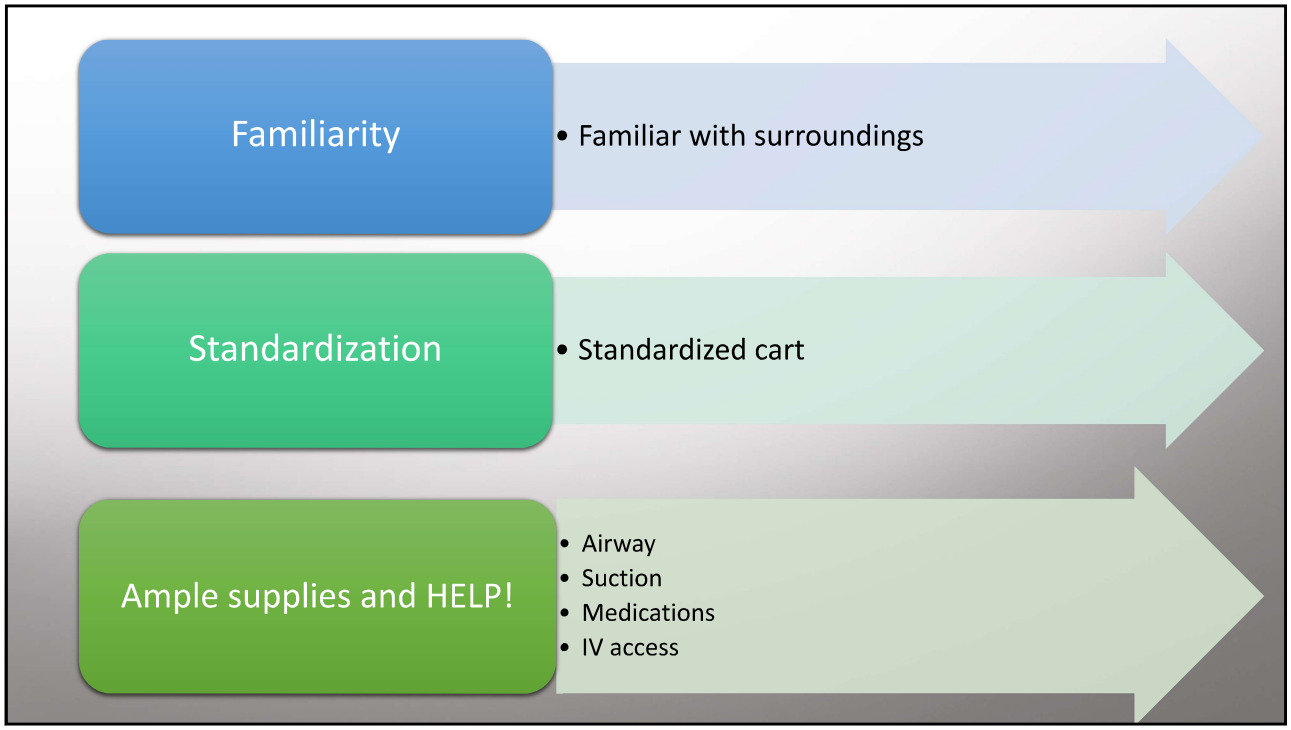
- Non-Operating Room Anesthesia
- Gi, Cath Lab/EP studies, Bedside Cases, MRI, Radiology department
- Goal is to ensure patient safety and adequate anesthesia to perform procedure in the Non-0R suite
- BE PREPARED!

3

Significance of Problem

- NORA Closed Claims have higher frequency of severe injury and death compared to OR cases
- In more than half of NORA-related claims involving deaths, patients were deemed to have received substandard anesthesia care preventable by improved monitoring techniques.
- Most claims were related to respiratory events, specifically inadequate oxygenation and/or ventilation.
- Monitored anesthesia care was the most common anesthetic technique used, contributing to 50% of claims.
  - Oversedation leading to respiratory depression was implicated in a third of all claims.
  - In most claims related to oversedation, there was *limited use of monitoring expired carbon dioxide or any respiratory monitoring at all.*

4

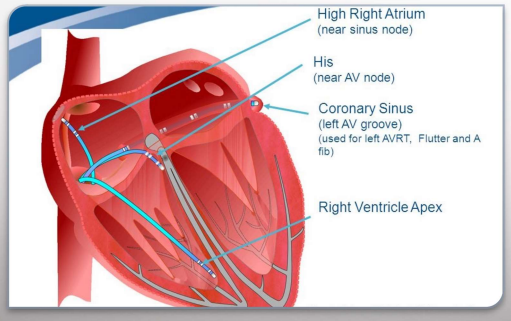


5

NORA locations

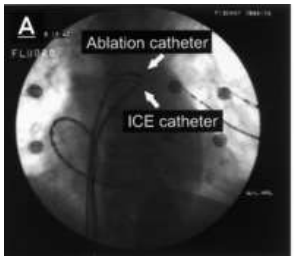
6

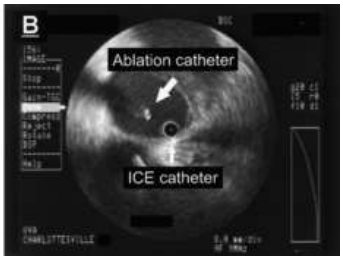
EP Study/Cardiology Suite



- Location
- Limited Space
- Limited Resources
- Patient Acuity
- Recovery Options
- Risk Factors

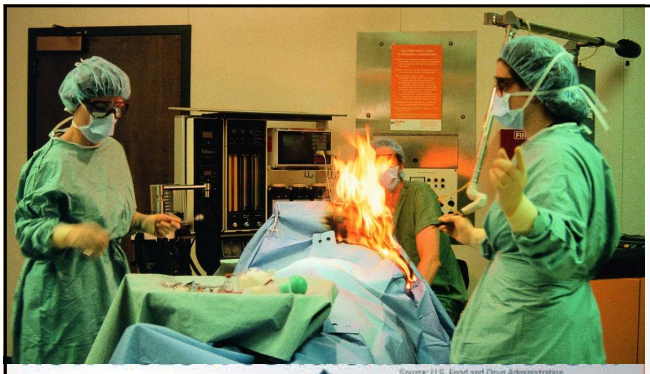
7





Electrophysiology studies	
Cardiac ablation	Radiofrequency Cryoablation
Device placement	Pacemakers Implantable Cardioverter Defibrillators

8



Source: U.S. Food and Drug Administration

Surgical Fire

- High risk with device placement
- Fire triangle
- Be your patients advocate!

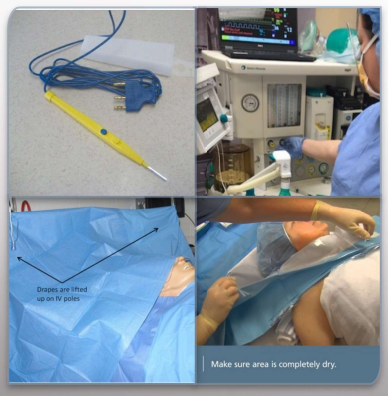
9

Surgical Fire Victims

- Temporal artery biopsy
- Mole excision from eyebrow
- Thyroidectomy

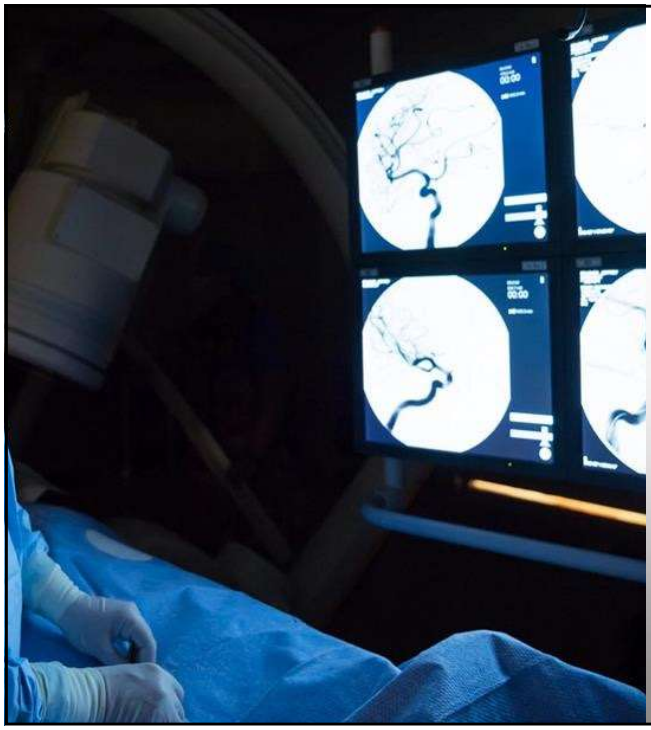
10

Considerations



- Limit oxidizer in field
- Avoid tenting of drapes
- Surgical prep
- Cautery considerations

11



Interventional Cath Lab

- Biliary and Hepatic cases
- Nephrostomy tube placement
- Oncology interventions
- Vascular cases
  - Embolization/arteriography
  - IVC filter placement
- TAVR

12

GI Lab

- Inpatient vs Outpatient
- Shared Airway
- Morbid Obesity trend
- Airway adjuncts available
- Help available
- Radiology cases
- NPO status
- Turnover times

13

Interventional Radiology

Uterine artery embolization	Kyphoplasty	Bone biopsy
Percutaneous transhepatic cholangiography (PTC)	Nephrolithotomy	Neuroradiology

14

Anesthesia at the Bedside

- Mobile unit
- Concerns
  - Charting
  - Adequate room to work
  - Shared Airway
  - Adequate supplies
  - "SAM I AM"

15

"SAM I AM"

- Suction
- Airway supplies
- Medications
- IV access
- Ambu bag
- Monitors

16

MRI

- MRI compatible equipment
- Limited access to patient airway [potentially]
- MRI education necessary for staff

17

How MRI works

Image creation through magnetic fields and radio waves

Images surpass ultrasound and CT technology

18

MRI Precautions

- MRI capable equipment required
- Unaffected by magnetic attractive forces, heating or current induction
- Patient screening preop; healthcare providers screened
- Caution with claustrophobic and morbidly obese patients

19

MRI procedures

- Breast and prostate biopsy
- Cryoablation of tumor

Cowles, Charles., Casarez, Vianey., Wiemers, John. "Extreme" Remote Locations Raise Unique Safety Concerns - Anesthesia Patient Safety Foundation. apsf newsletter. Published October 2015.

20

Radiology Dept

- Remote location
- Limited airway access
- Radiology specific education needed

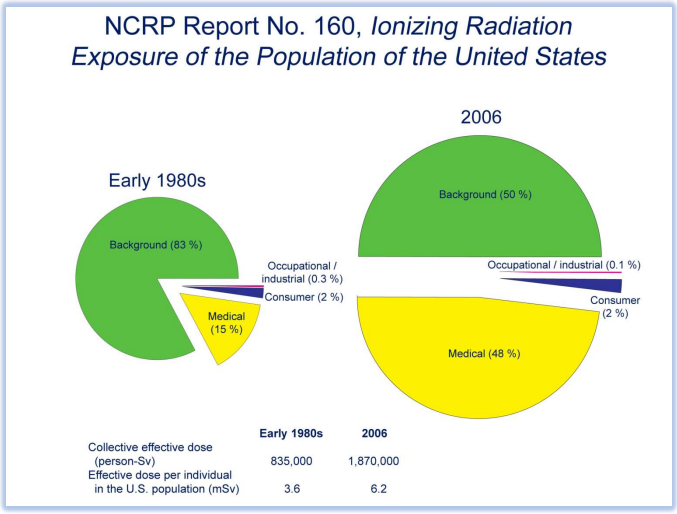
21

Man-made Radiation Sources

- Diagnostic Uses:
  - X-ray machines
  - CT scanners
  - Nuclear medicine tests
- Therapeutic Uses:
  - Linear accelerators
  - Radioactive “seeds” for permanent implants
  - Other radioactive sources

22

Radiation Exposure is Increasing



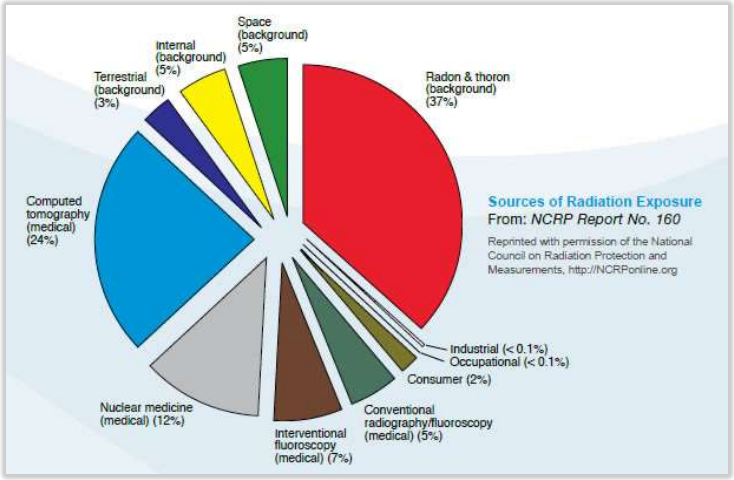
23

So, what has changed?

- Large increase in number of CT scans
- Increase in nuclear medicine procedures
- Newer medical techniques involve higher doses to the patient

24

Sources of Radiation



25

Occupational Dose Limits

- Limits for radiation doses received by occupational radiation workers are defined by the Nuclear Regulatory Commission (NRC).
- *Applies only to occupational workers* – individuals exposed in course of their work.
- Does not include background radiation, medical administration to the worker, or other exposures as a member of the public.

Note: this means that radiation doses to an individual from medical procedures performed on them do not fall under these regulations – a frequent concern of radiation workers.

26

Occupational Dose Limits

Part of Body	Maximum Annual Dose
Whole Body, Total Effective Dose	5 rem (0.05 Sv)
Lens of Eye, Dose Equivalent	15 rem (0.15 Sv)
Individual Organ, Extremity Dose, Skin	50 rem (0.5 Sv)
Embryo/fetus dose of declared pregnant female (See NRC Reg. Guide 8.13)	0.5 rem (5 mSv) during entire pregnancy (See 10CFR20.1208 for additional information and guidelines)

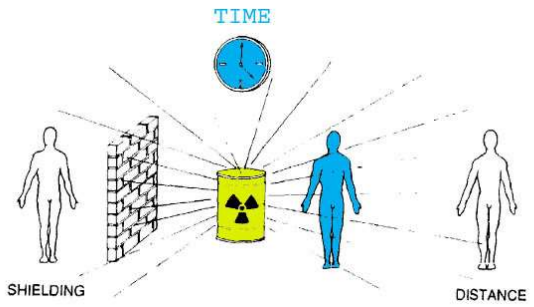
27

Using Radiation & Fluoroscopy

28

Radiation Protection Methods

- Minimize Time
- Maximize Distance
- Maximize Shielding



29

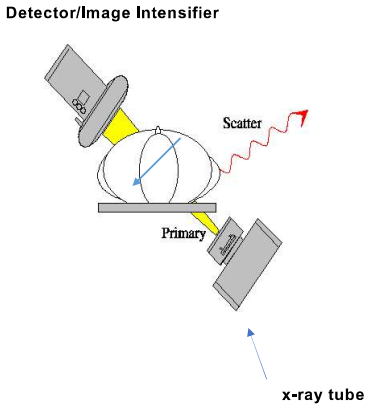
What About Personnel Safety?

Physicians and staff using fluoroscopy are exposed to:

- Scattered radiation from the patient
- Leakage radiation from the x-ray tube
- Primary radiation from the x-ray beam if their hands are in the radiation field

30

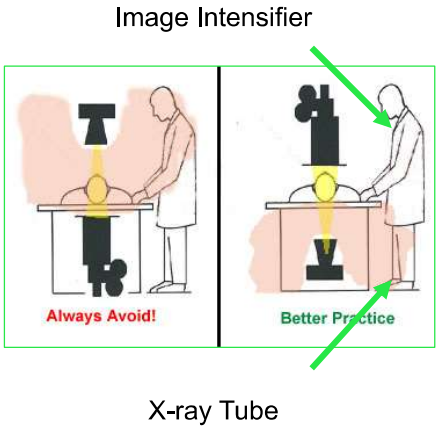
Distance: Scattered Radiation



- During fluoroscopy, radiation is scattered from the surface of the patient where the x-ray beam enters.
- Scattered radiation is the main source of radiation dose to staff. It also decreases image contrast and degrades image quality.

31

Distance: C-Arm Position

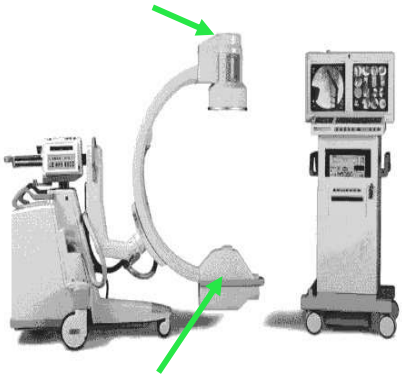


- Position the X-ray tube underneath the patient
- The greatest amount of scatter radiation is produced where the x-ray beam enters the patient.

32

Distance: C-Arm Position

Always stand closer to the detector/image intensifier.



Always stand farther from the X-Ray Tube.

33

Distance: C-Arm Position

- Position the x-ray tube as far from the patient as possible.
- Position the Image intensifier as close to the patient as possible.
- Position the x-ray tube and image intensifier so you are working on the image intensifier side of the patient.

34

Shielding

- Regulations require anyone within 6 feet of a fluoroscopy machine to wear a lead apron.
- You may also wear a lead thyroid shield or leaded eyeglasses, depending on the type and amount of work you do.

35

Dosimetry Badges

- If you have been issued a single dosimetry badge, wear it **outside** your lead apron at collar level.
- If you have been issued two badges, wear the **"collar badge" outside** your lead apron, and wear the "**body badge" underneath** your lead apron.
- Fetal badges are to be worn under the protective apron at waist.

36

Conclusion

- Non OR anesthesia requires proper communication and preparation
- Intention is to provide same standard of care as operative suite with less predictable circumstances
- Awareness of potential hazards to both patients and personnel are paramount for safe anesthetic administration

37

References

- American Society of Anesthesiologists., Charlotte, and American Society of Anesthesiologists. 2013. "NORA: Non- O.R. Anesthesia." *ASA Newsletter* 77(11): 10–10.
- Cowles, Charles., Casarez, Vianey., Wiemers, John. 2015. "'Extreme' Remote Locations Raise Unique Safety Concerns - Anesthesia Patient Safety Foundation." *apsf newsletter*. Ferrari, Lynne R. 2015. "Anesthesia Outside the Operating Room." *Current Opinion in Anaesthesiology* 28(4): 439–40.
- Judy Mathias. 2017. "Non-OR Anesthesia Care Growing in US." https://www.ormanager.com/briefs/non-or-anesthesia-care-growing-in-us/.
- Mangrum, James Michael et al. 2002. "Intracardiac Echocardiography-Guided, Anatomically Based Radiofrequency Ablation of Focal Atrial Fibrillation Originating from Pulmonary Veins." *Journal of the American College of Cardiology* 39(12): 1964–72.
- Methangkool, Emily. 2018. "The Perils and Pitfalls of Anesthesia Outside the Operating Room." *Anesthesiology*. https://opmed.doximity.com/articles/the-perils-and-pitfalls-of-anesthesia-outside-the-operating-room.
- Miller, Ronald D. et al. 2014. *Miller's Anesthesia.* Elsevier Health Sciences.
- Peterson CD, Leeder JS, Sterner S. Glucagon therapy for beta-blocker overdose. *Drug Intell Clin Pharm*. 1984;18(5):394-398.
- Statement on Nonoperating Room Anesthesia Services. www.asahq.org. https://www.asahq.org/standards-and-practice-parameters/statement-on-nonoperating-room-anesthesia-services
- Walls, Jason D., Weiss, Mark S. Safety in Non-Operating Room Anesthesia (NORA) APSF Newletter 34 (1)
- Wong T, Georgiadis PL, Urman RD, Tsai MH. Non-Operating Room Anesthesia: Patient Selection and Special Considerations. *Local Reg Anesth*. 2020;13:1-9. Published 2020 Jan 8. doi:10.2147/LRA.S181458

38