

Life Saving Procedures in Trauma

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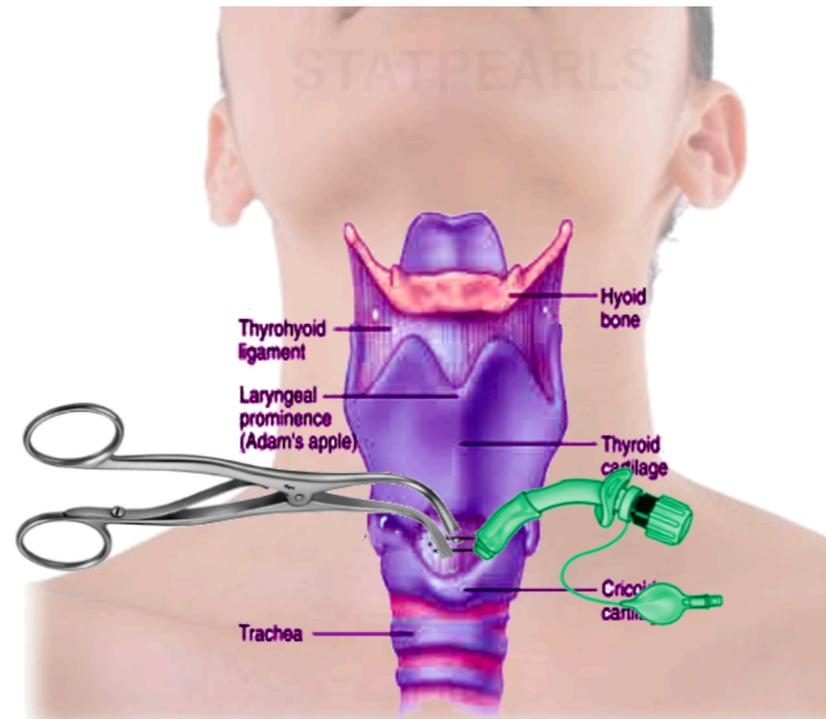
Disclosures

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Objectives

Objectives

Cricothyrotomy



Objectives

Objectives

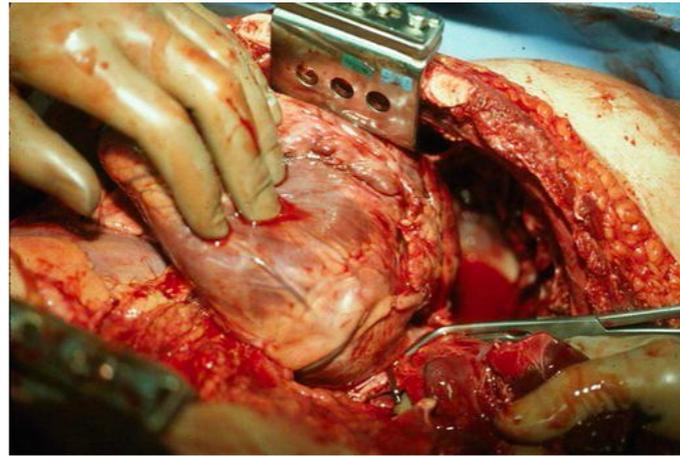
Perimortem C-Section



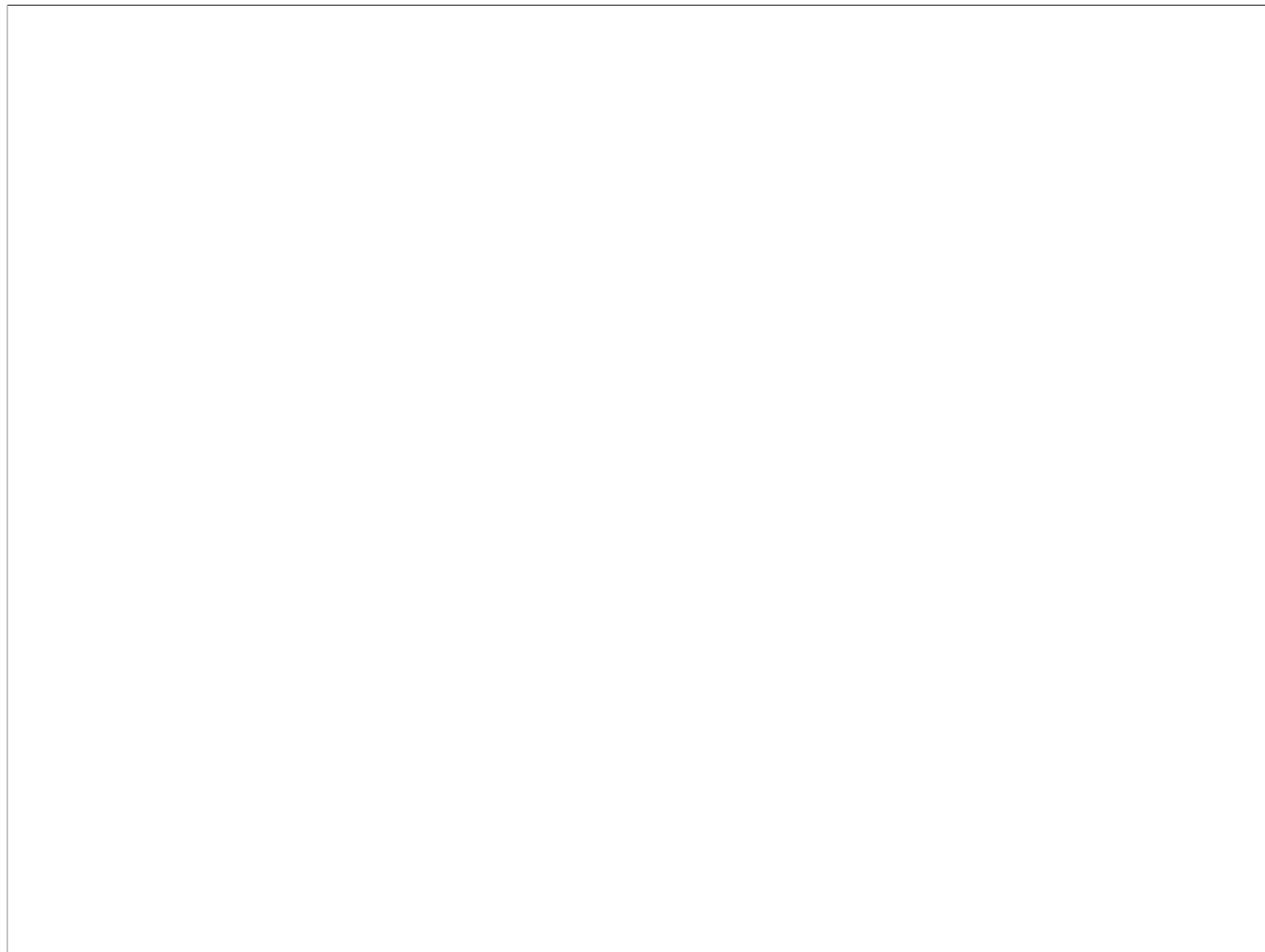
Objectives

Objectives

Resuscitative Thoracotomy



Objectives



Life Saving Procedures—> Not everyday; HIGH Stake; when they are present—> Anxiety-provoking

5-6 second Procedural ritual to anchor us or ground us before GO-TIME





Grounding Moment



Grounding Moment



Cricothyrotomy- Who?

Unable to Intubate

- **Clenched Teeth**/Masseter Spasm
- Laryngospasm
- **Airway Obstruction**- **FB/Tumor/Food in Airway**, Angioedema
- Traumatic Airways (**Max-Face Injuries**—> **disruption of facial anatomy; sign bleeding obstructing view**)
- C-spine Injuries—> 1-2mm of Anterior-Posterior C-spine displacement

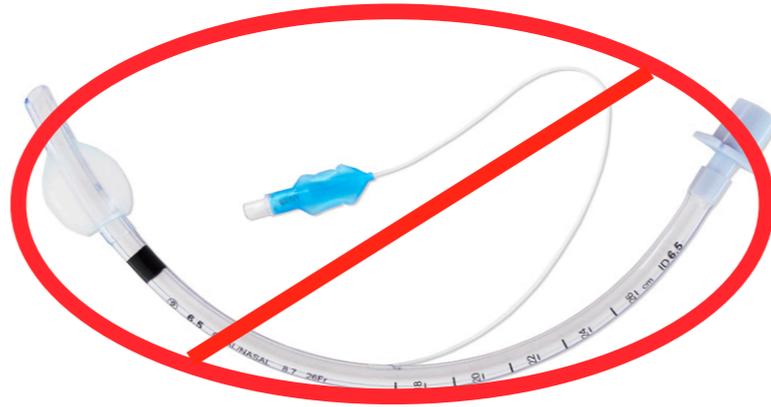
Contraindications

- Easily and Quickly Intubate
- **Transection of trachea, Tracheal Fx** (damage to the cricoid cartilage)—> controlled setting; awake—> flex branch

Cricothyrotomy- Who?



Cricothyrotomy- Who?



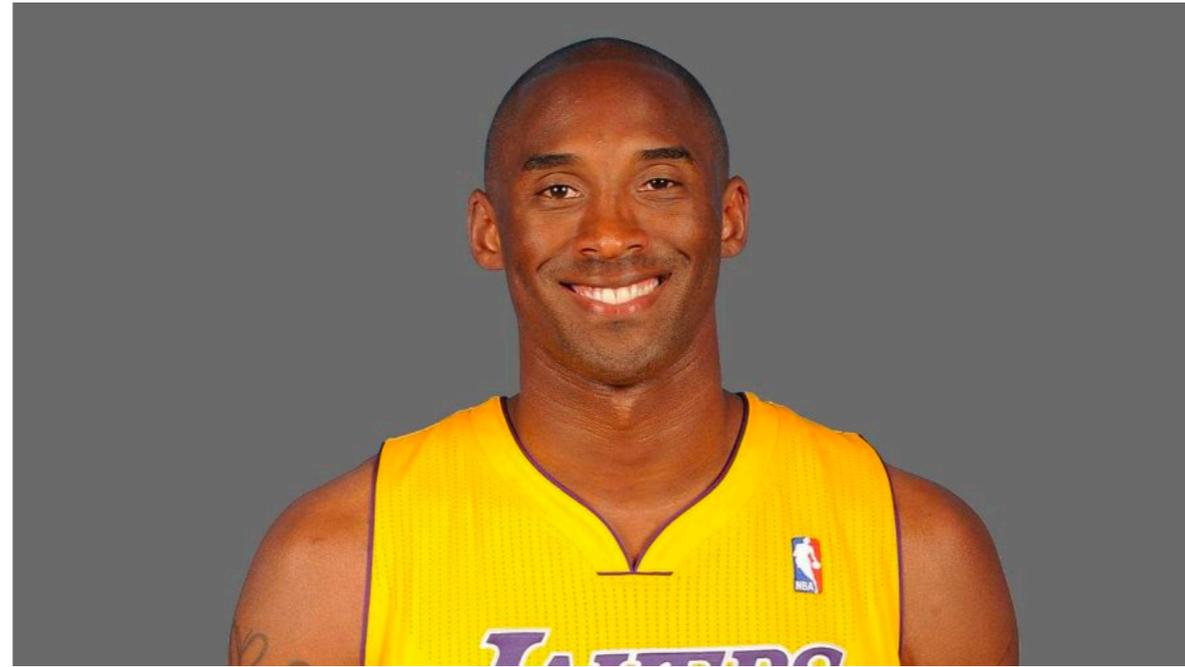
Cricothyrotomy- Why?

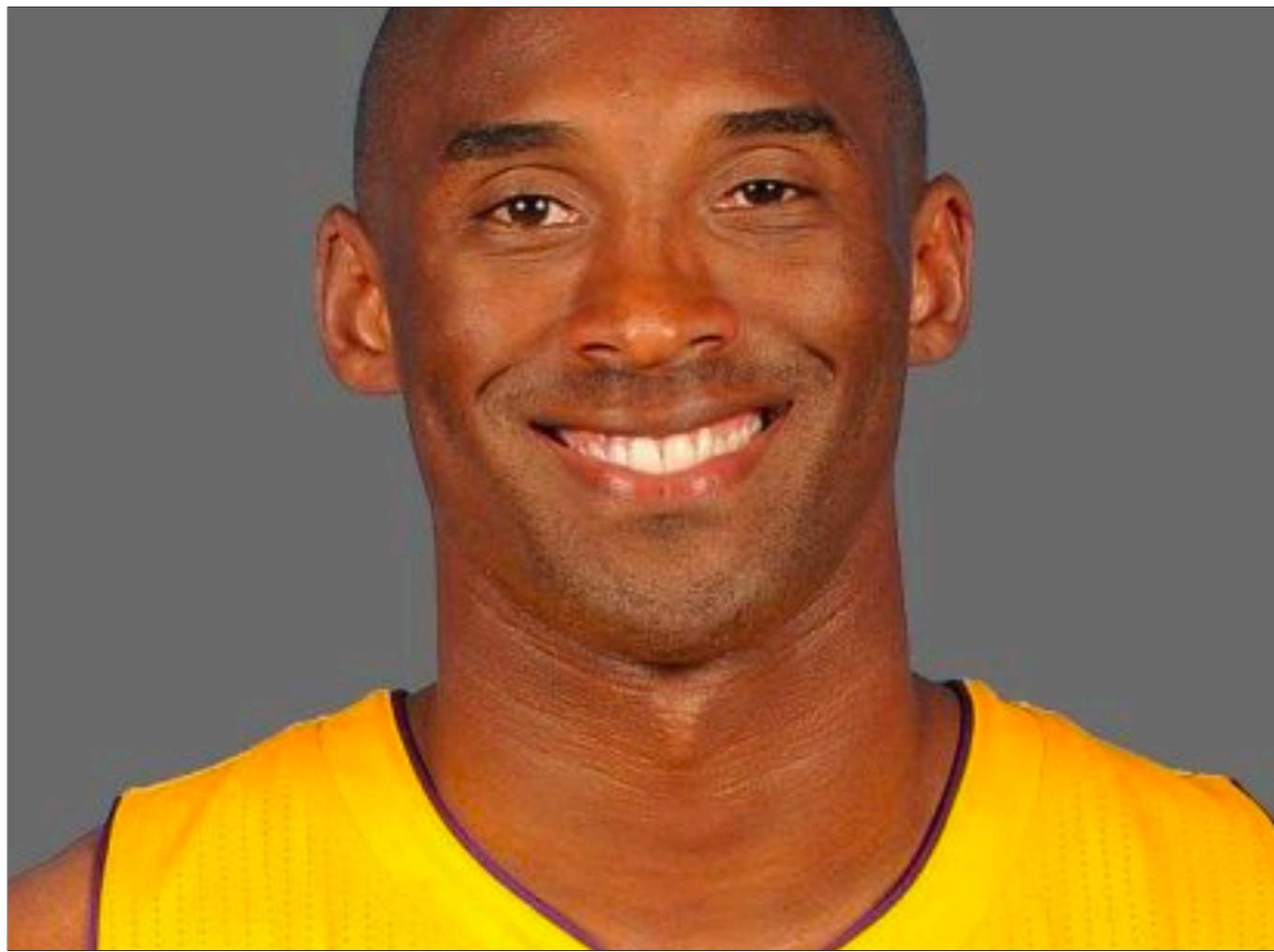
Anatomic Adv:

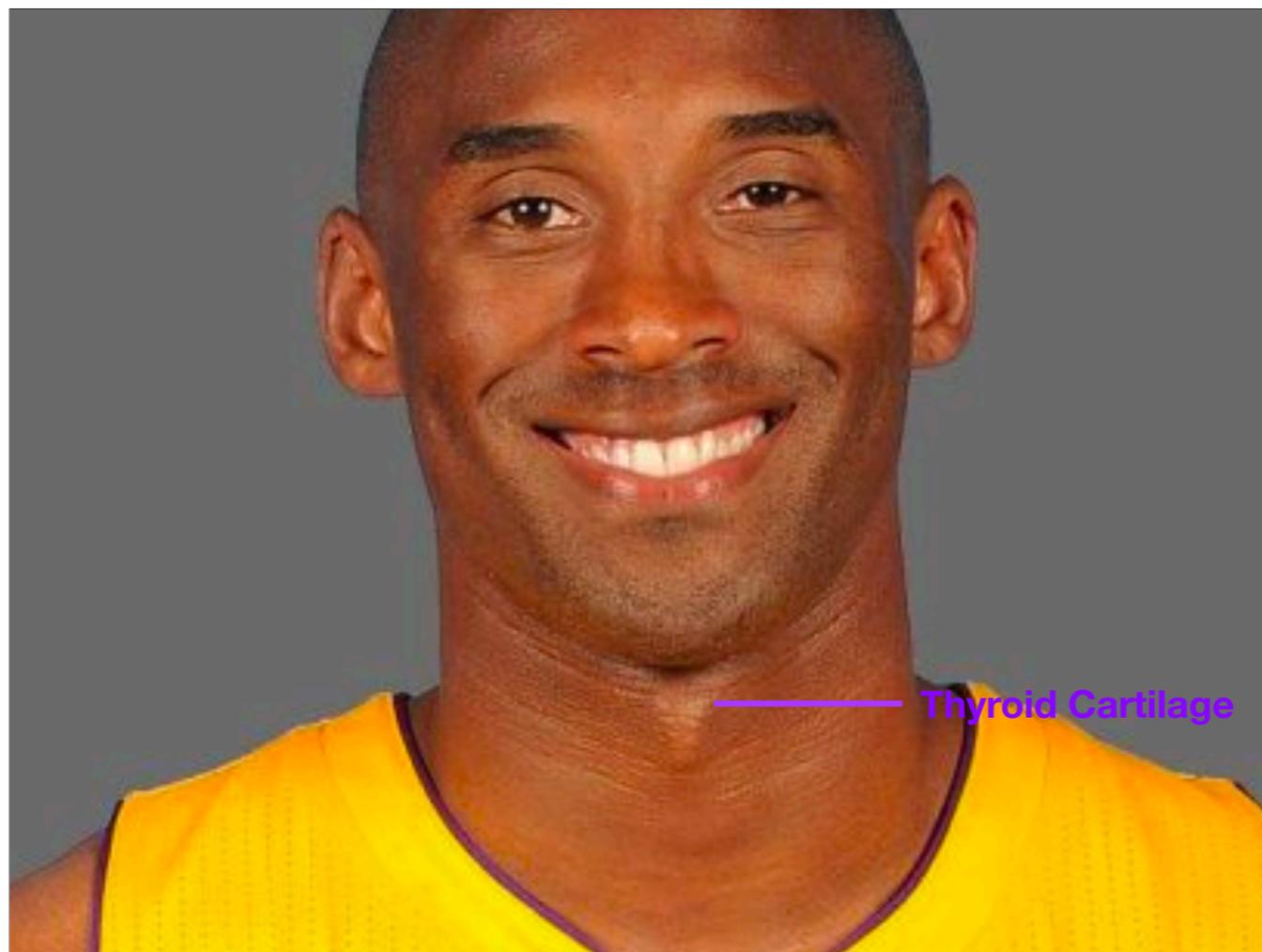
- Easily ID landmarks
- Immediately BELOW SubQ location
- ↓ chance of esophageal injury

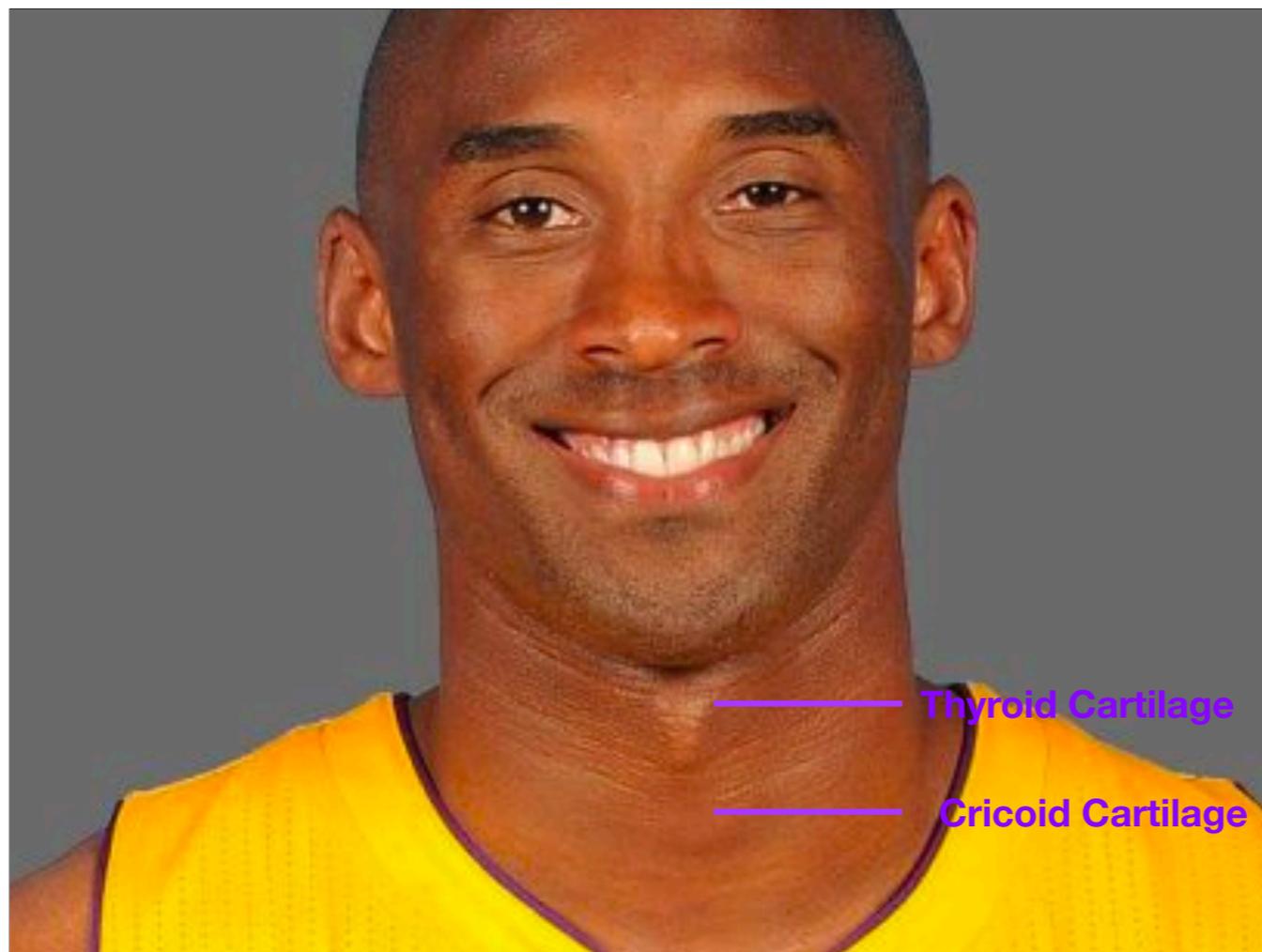
Cricothyrotomy vs Tracheostomy

Cricothyrotomy vs Tracheostomy



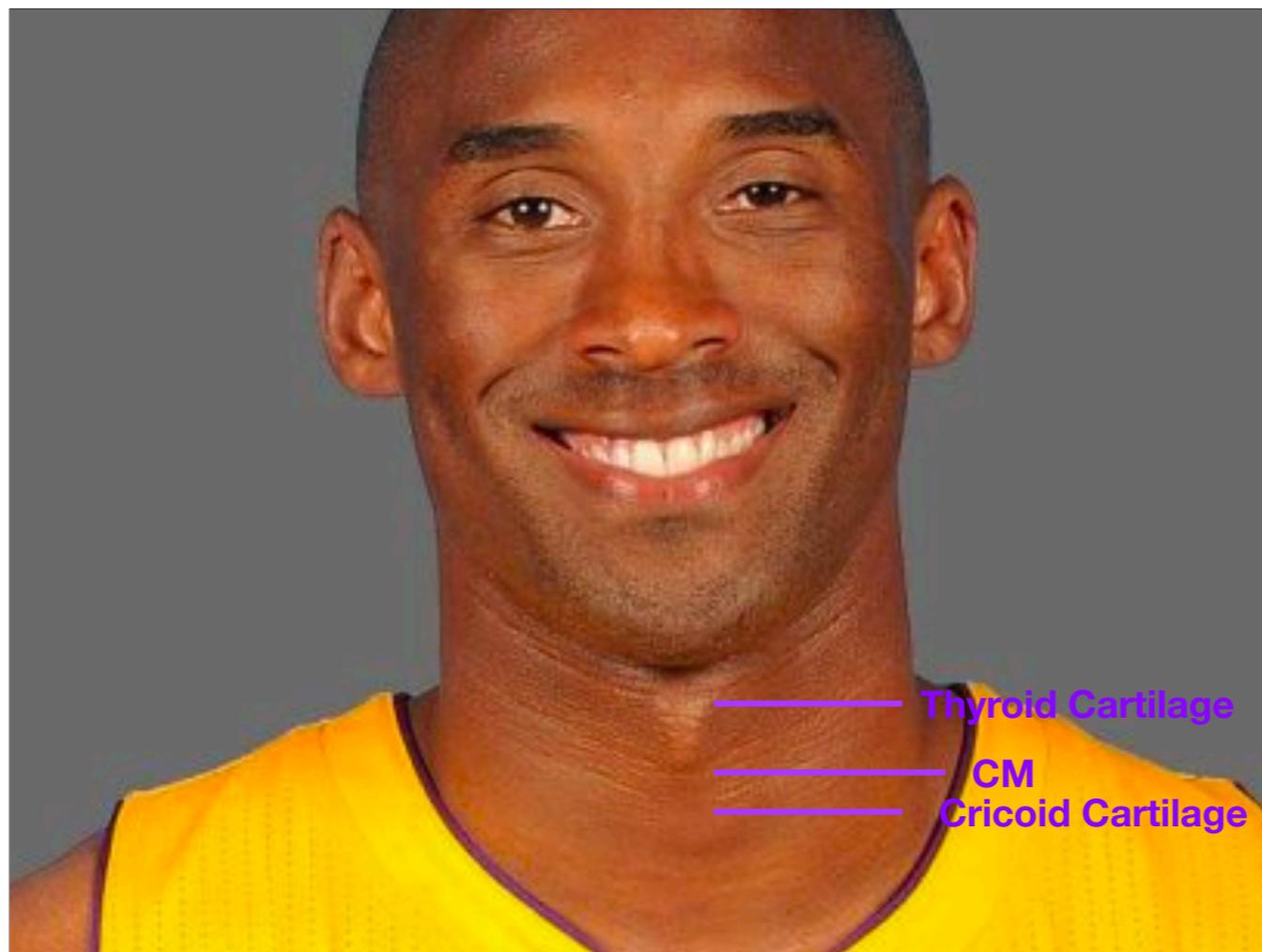






Thyroid Cartilage

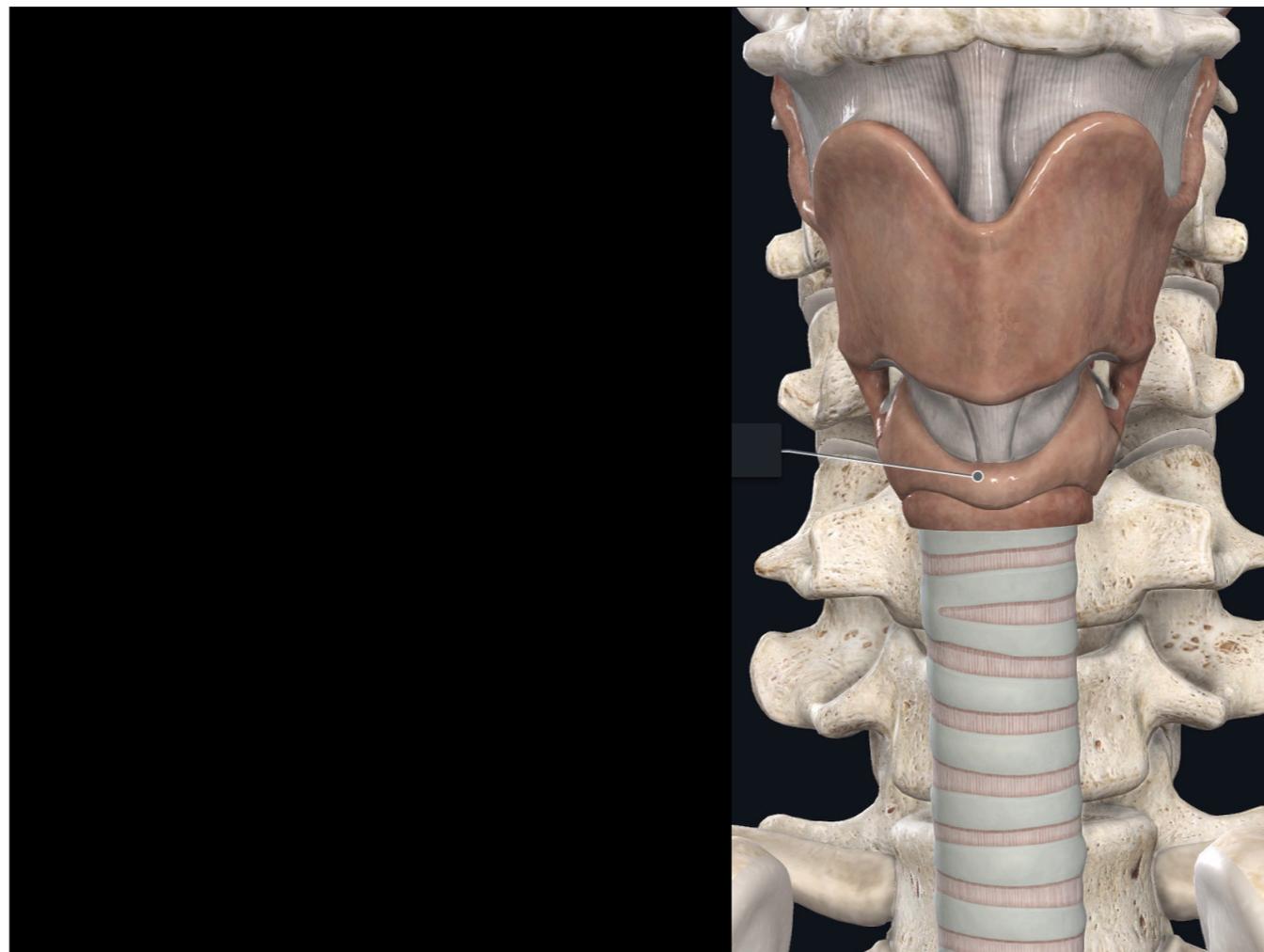
Cricoid Cartilage



Thyroid Cartilage

CM

Cricoid Cartilage

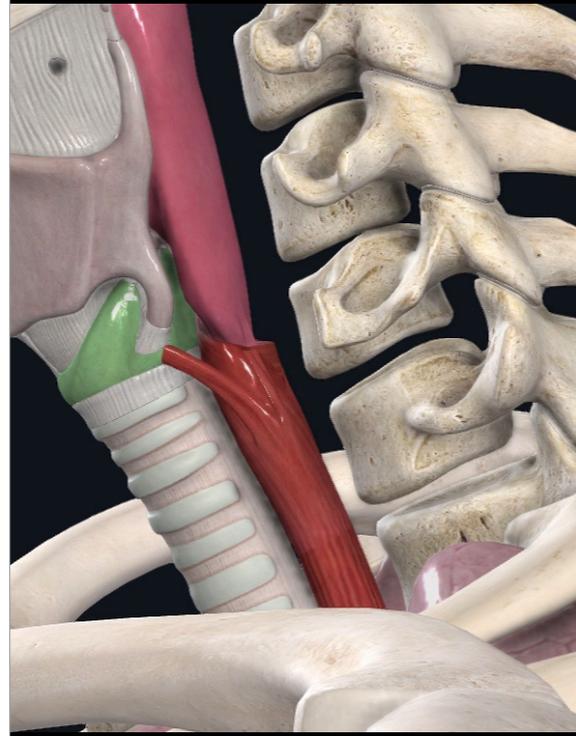


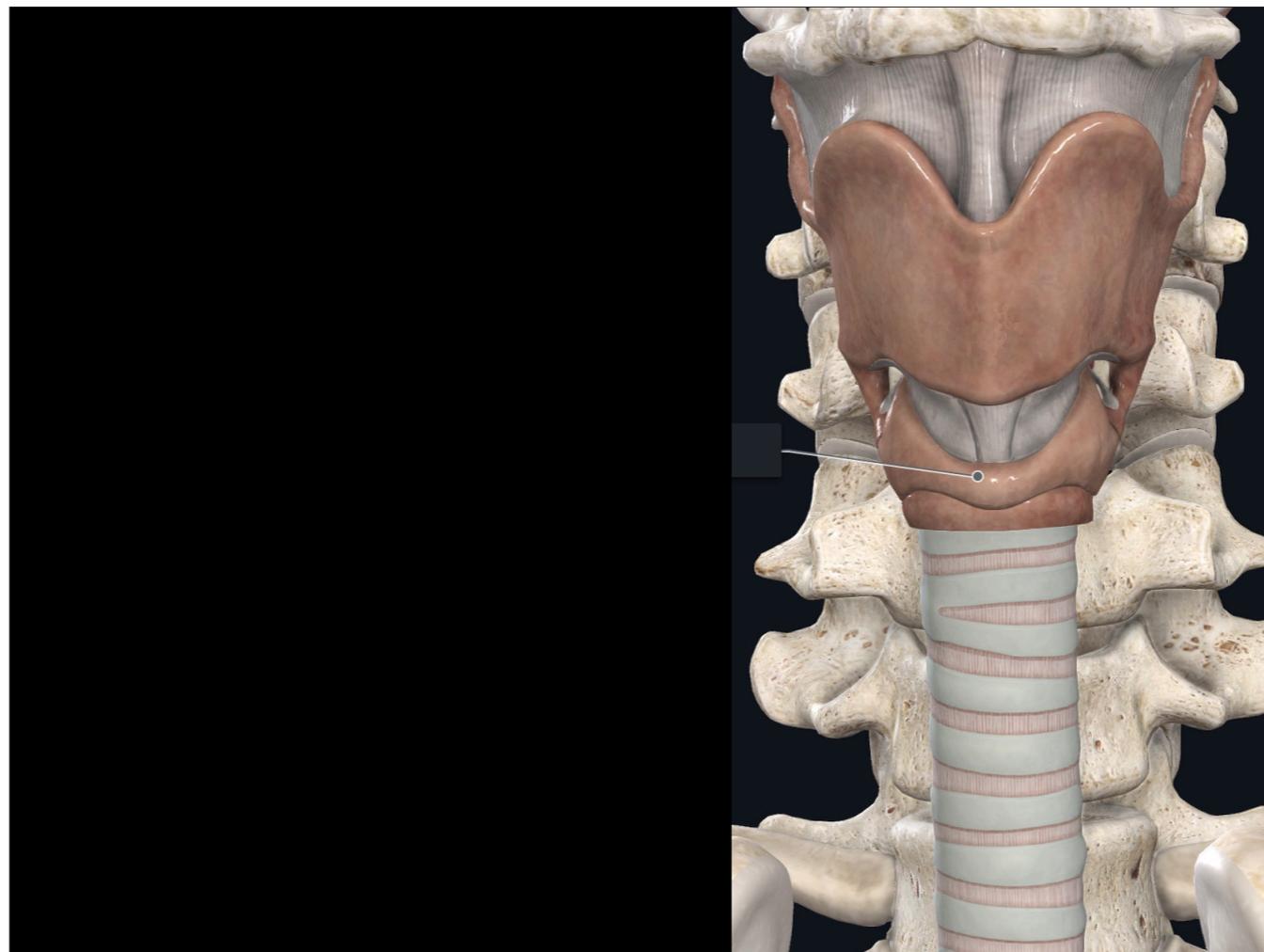
-↓chance of esophageal injury (posterior cricoid cartilage) vs no posterior coverage of the tracheal rings.

Diagrams with mostly skeletal and Connect Tissue Anatomy (look easy)

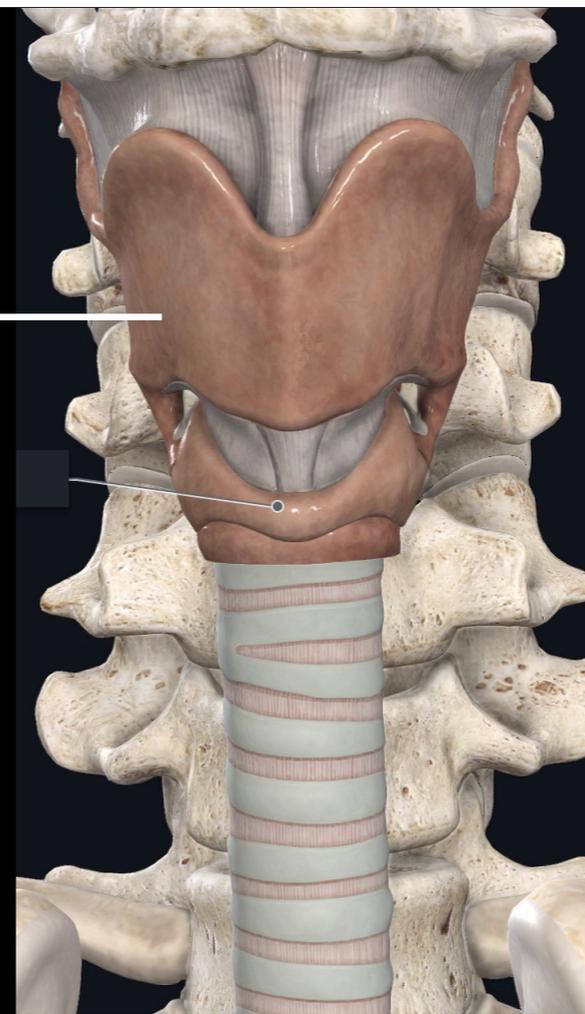
Tracheostomy (Standard b/w 2nd and 3rd rings)

Layer on anatomy—> lots of surrounding structures incr risk of complicxns with trach



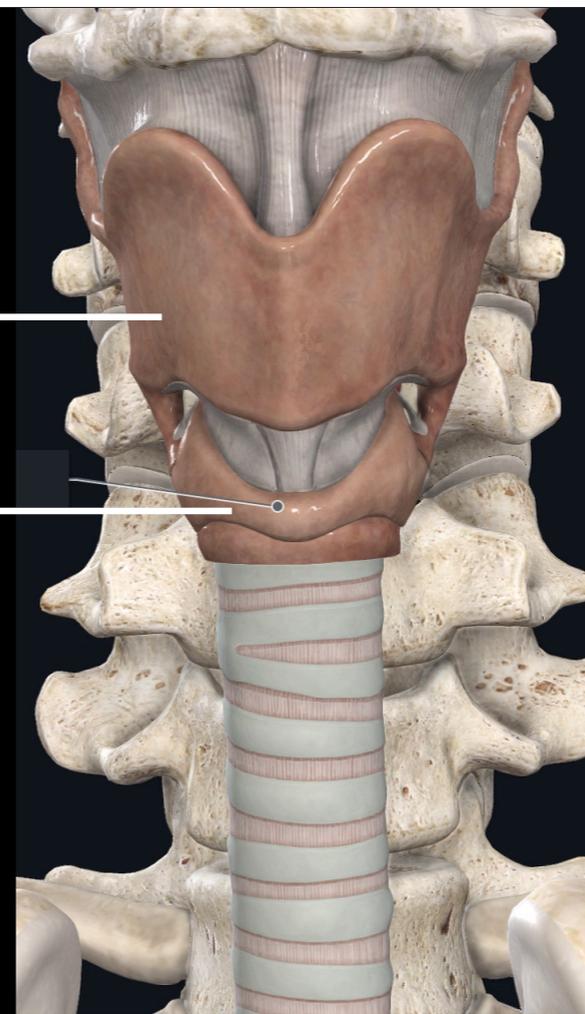


Thyroid Cartilage



Thyroid Cartilage

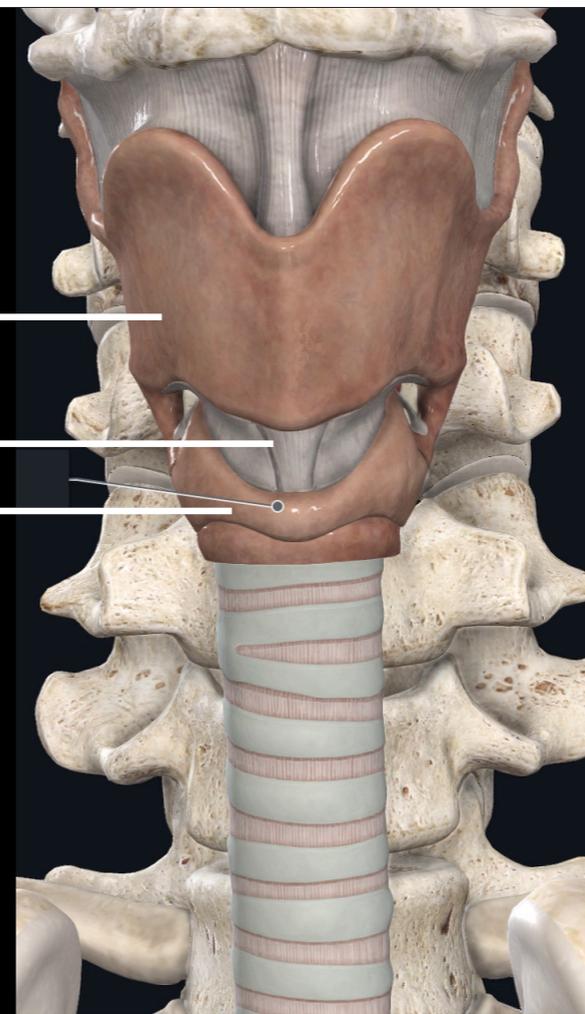
Cricoid Cartilage



Thyroid Cartilage

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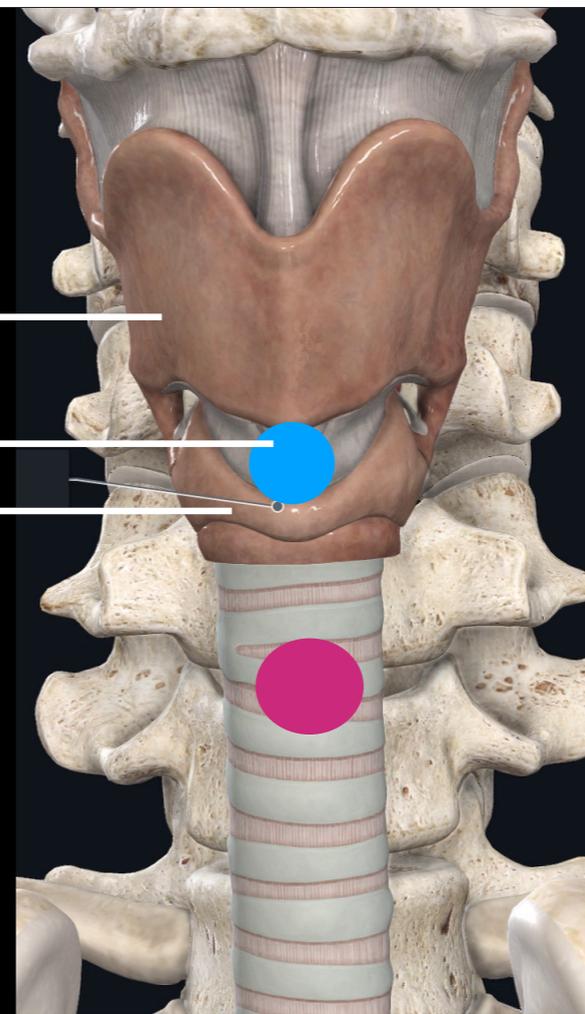
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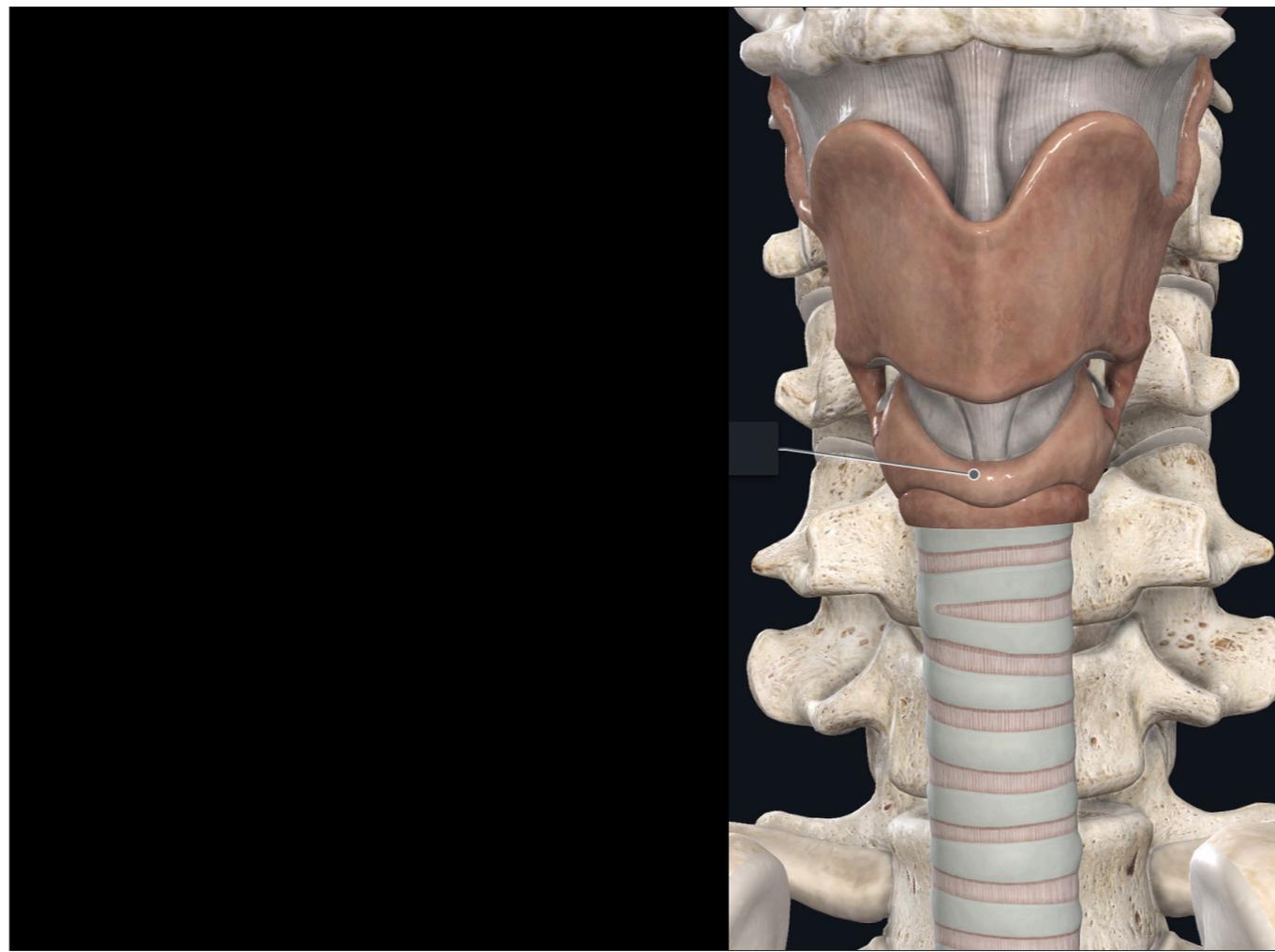


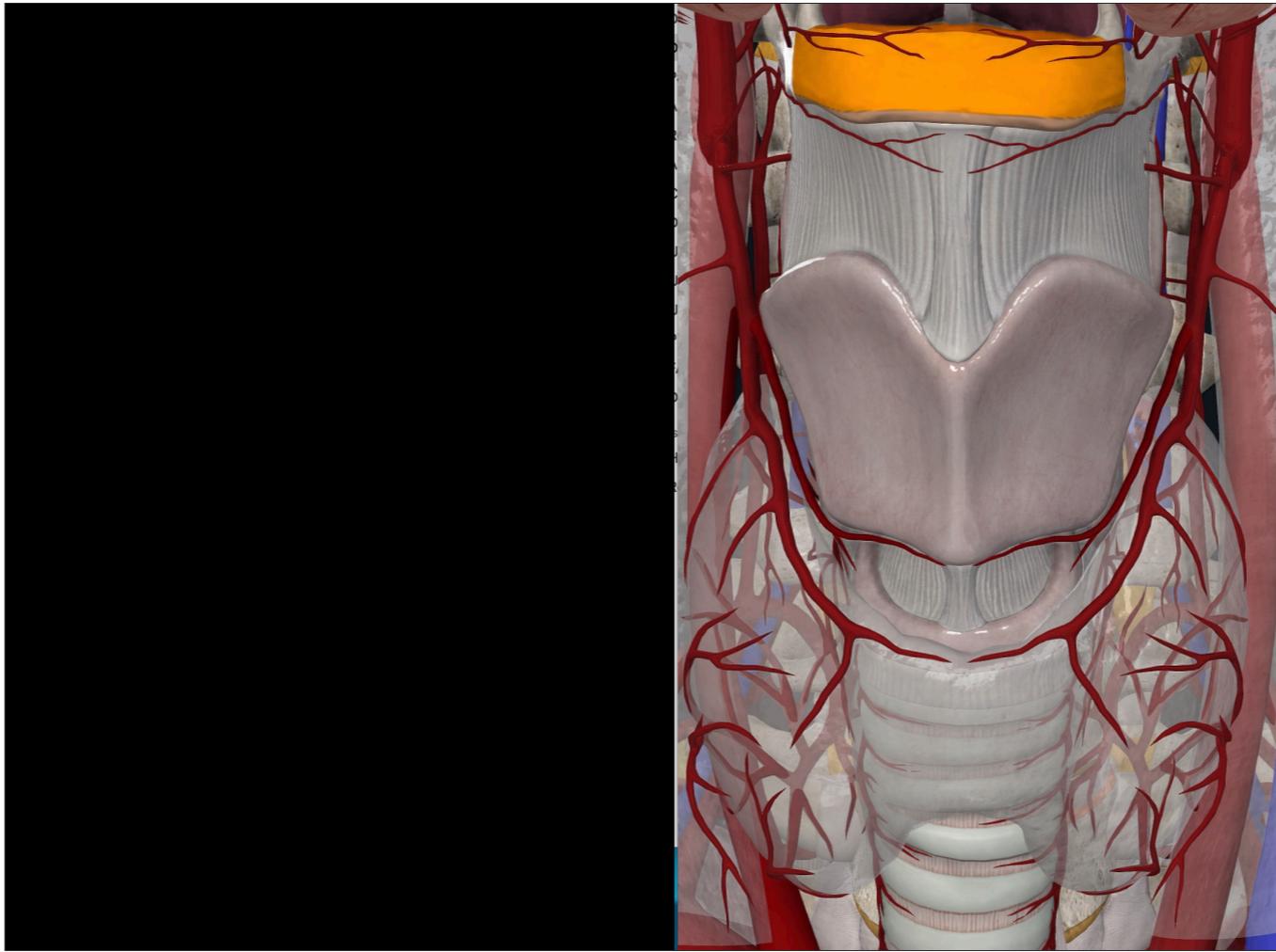
Thyroid Cartilage —

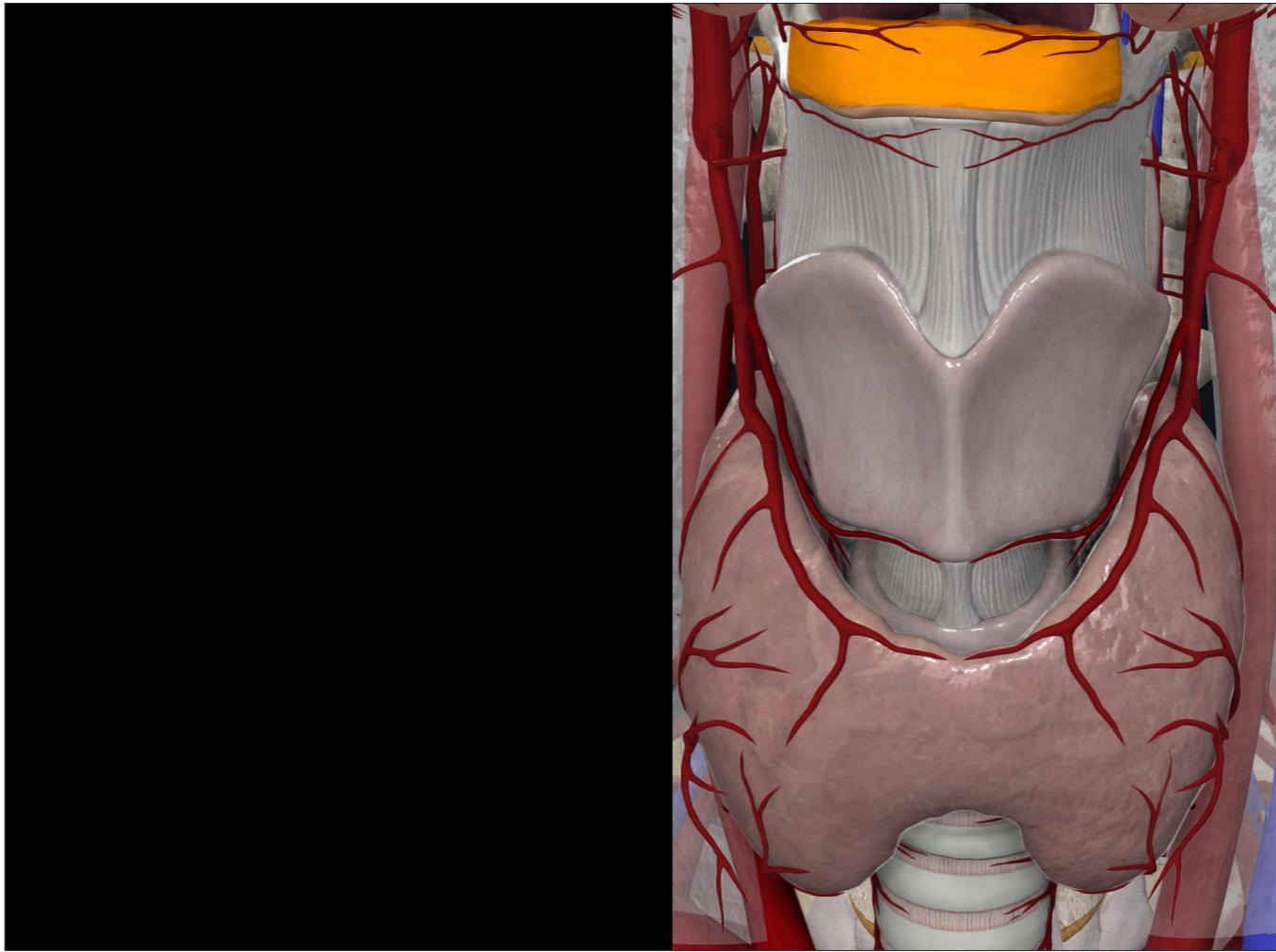
CM —

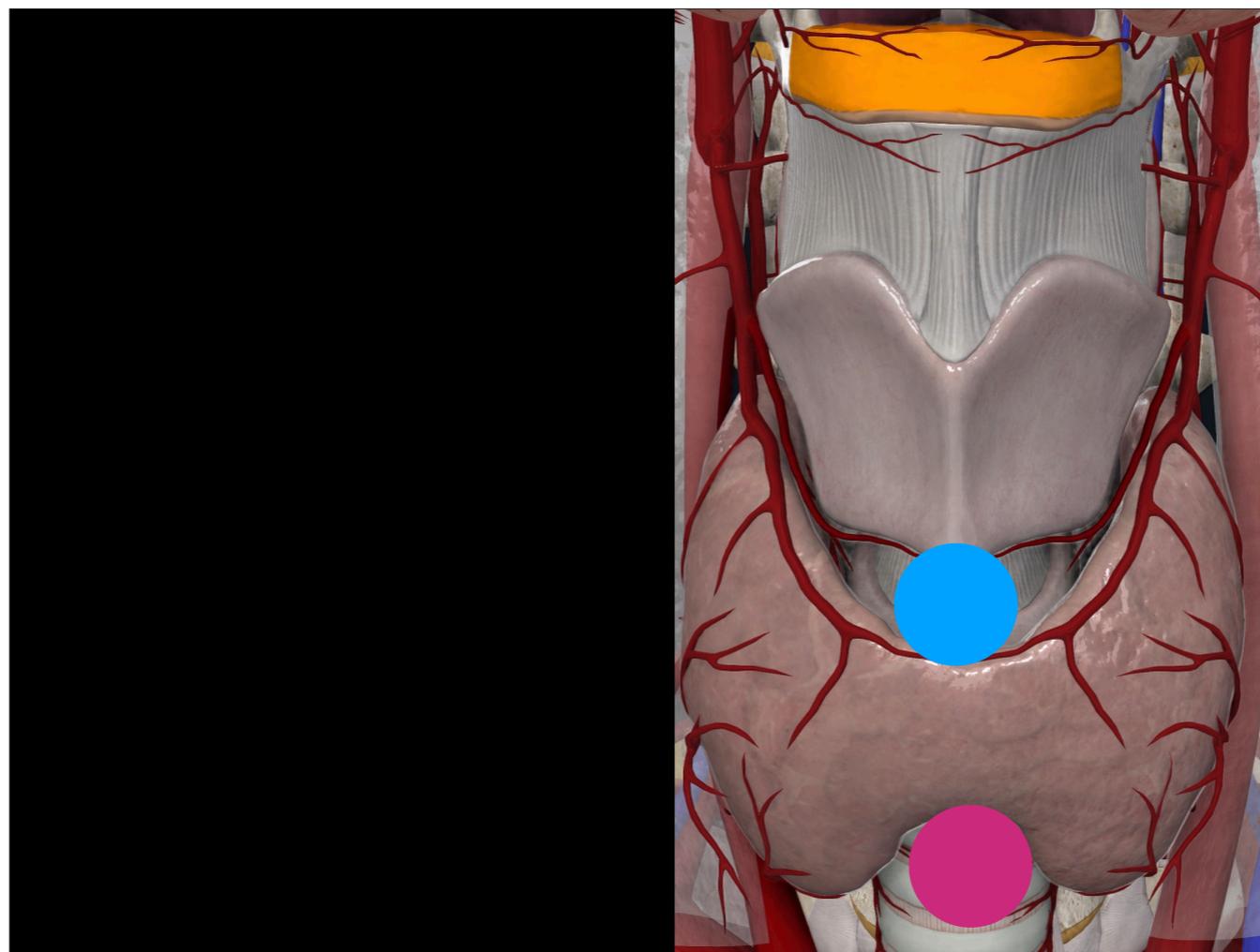
Cricoid Cartilage —











Cricothyrotomy > Tracheostomy

Late complications —> Tracheal Esophageal Fistulas and innominate artery erosions

Cricothyrotomy > Tracheostomy

Anatomic Advantages

- Landmarks
- SubQ
- Surrounding Structures
- Cosmesis
- ↓ Complications

Cricothyrotomy > Tracheostomy

Anatomic Advantages

- Landmarks
- SubQ
- Surrounding Structures
- Cosmesis
- ↓ Complications

↓ Complications

- PTX
- Mediastinal Injuries
- Esophageal Injuries
- Fistulas
- Innominate Artery Erosion

Techniques

Techniques

- Surgical Cricothyrotomy
- Bougie-Assisted Surgical Cricothyrotomy
- Needle Cricothyrotomy

Locate Anatomy

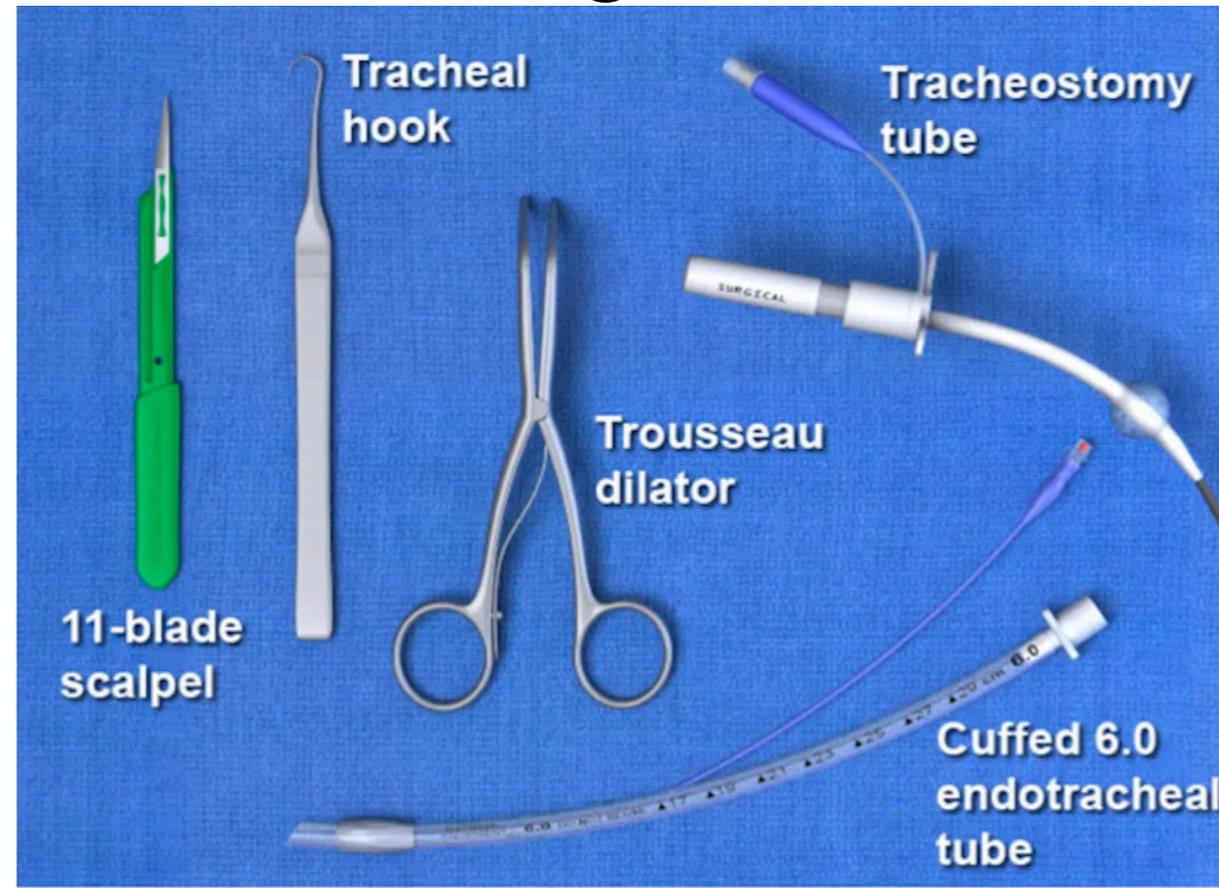


Stabilize the head and larynx while locating the anatomy

Locate Anatomy



Surgical



Surgical



Palpate the anatomy

11-Blade to make a 2-3 cm vertical incision through skinned sub Q tissue

Place your finger in incision to palpate the membrane

Stabbing horizontal incision through the cricothyroid membrane

Finger into the stoma

Place tracheal hook in the membrane, rotate this cephalad to stent the opening

Place the dilator in the opening and to dilate the opening

Slide in your trach tube or ETT, remove the inner canal, inflate cuff, ventilate pt

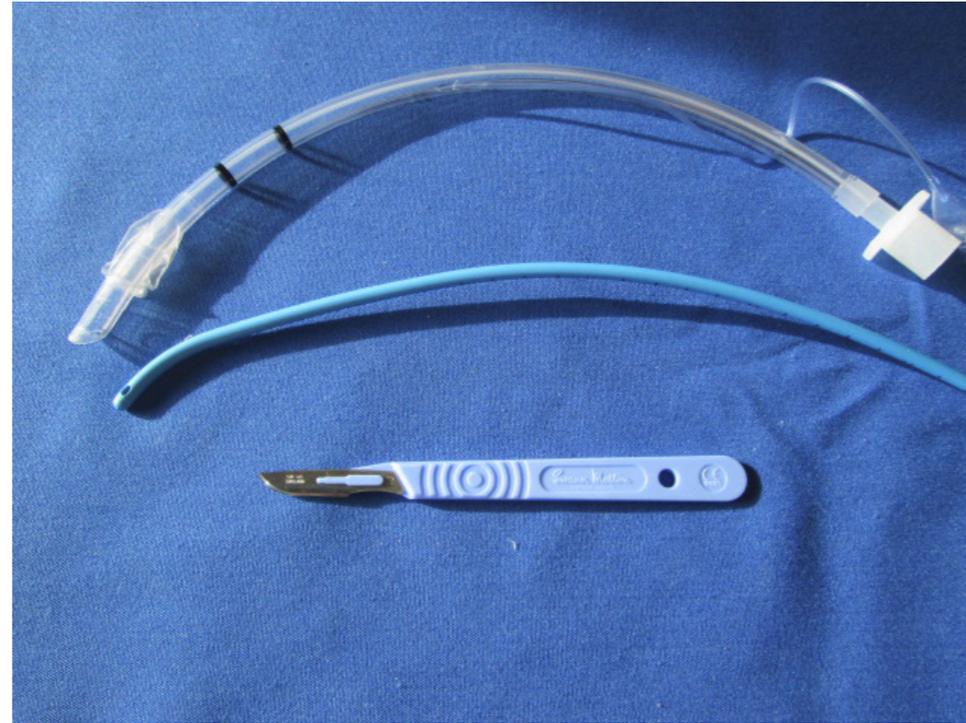
Surgical



Surgical



Bougie-Assisted



- Surgical approach lots of equipment (equipment that we don't use often), lots of steps to the procedure
- Less equipment; equipment that is easily available most airway carts or resuscitation rooms
- Combines surgical and utilizes Seldinger technique with the Bougie as a place holder
- Advantage: Quick (40 sec); equipment that we are comfortable using; technique comfortable using (seldinger)

Ram Parekh did procedure—> Allowed use of video for education

Bougie-Assisted



Ram Parekh did procedure—> Allowed use of video for education

You can see the scalpel getting hung up on the thyroid cartilage

Critique: Grasping the larynx in the beginning of this video—> Monday morning QB

Wonderfully done procedure

Thread bougie until you hit resistance at carina—> slide tube over bougie —> CAN PRELOAD TUBE OVER BOUGIE to save time!

Arrested—> Jaw wired shut from prior procedure

Bougie-Assisted



Bougie-Assisted

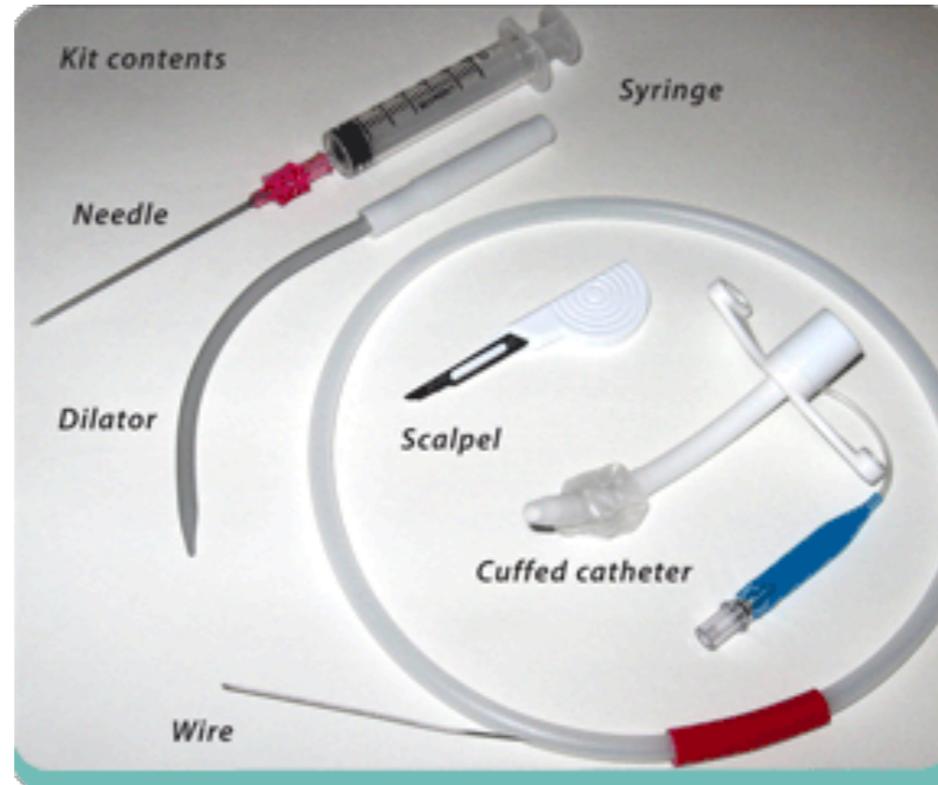


Courtesy of Dr. Ram Parekh

Bougie-Assisted



Needle Cricothyrotomy



Variety of kits

All contain the following

Seldinger technique similar to placement of Central Line

Needle Cricothyrotomy

I will demo on headless model

Head of the bed- preferred position

Entering into the CM with a needle attached to a fluid filled syringe

Slide trach tube with cannula over wire

Remove the cannula and wire

Inflate your cuff and attach your BVM to ventilate

Needle Cricothyrotomy



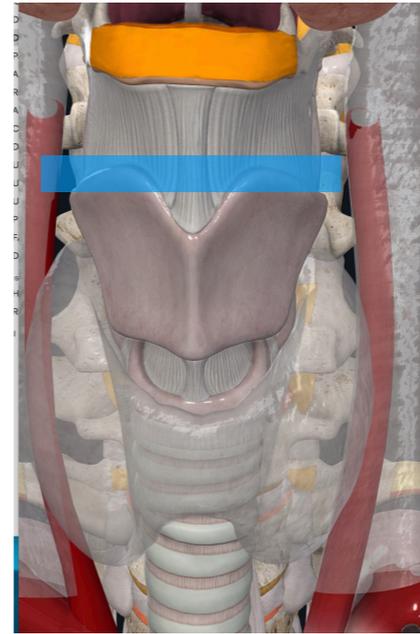
Ultrasound



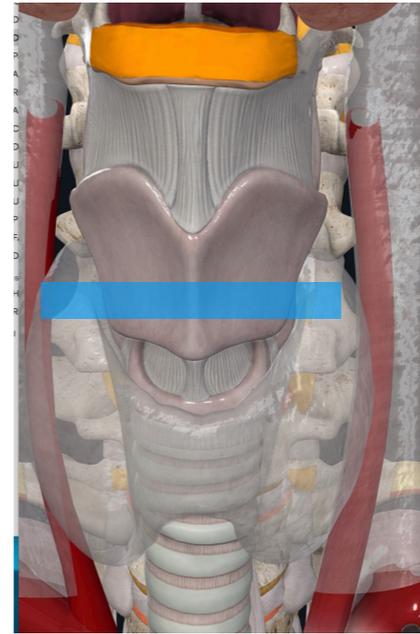
US-Assistance

US allows you to mark the cric membrane with difficult external anatomy or neck girth

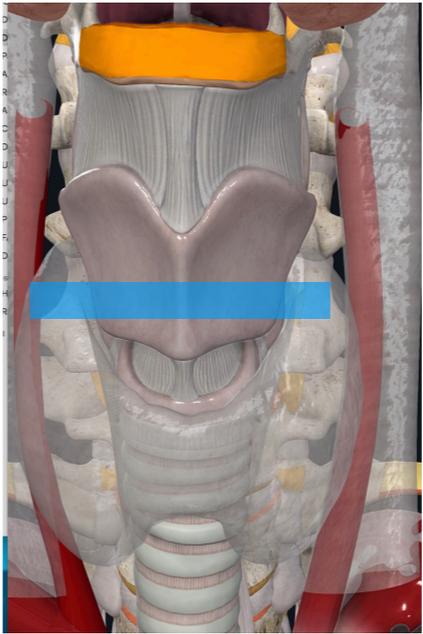
Ultrasound



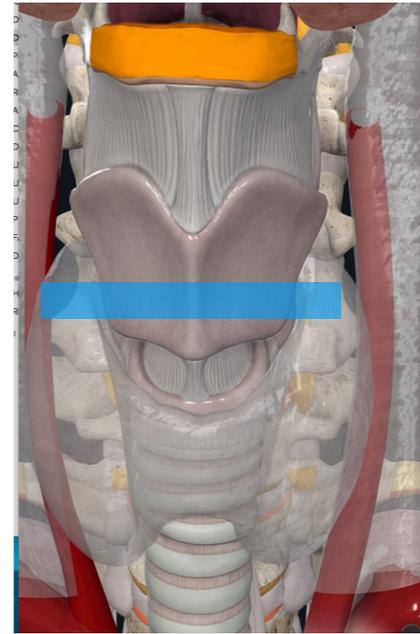
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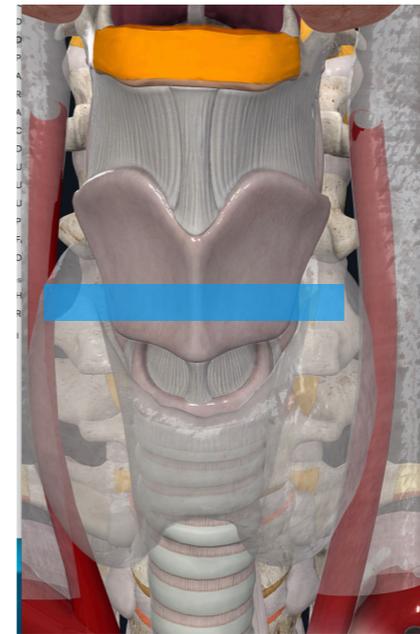
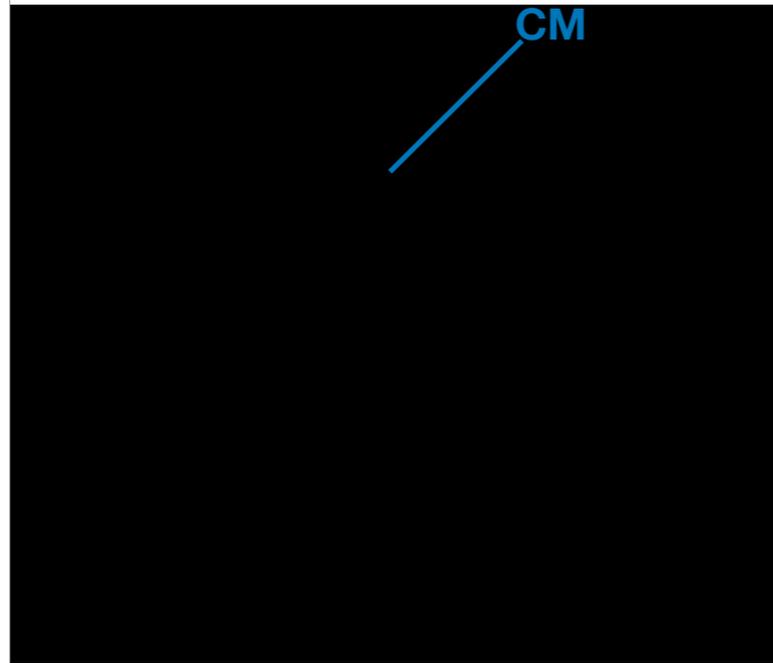
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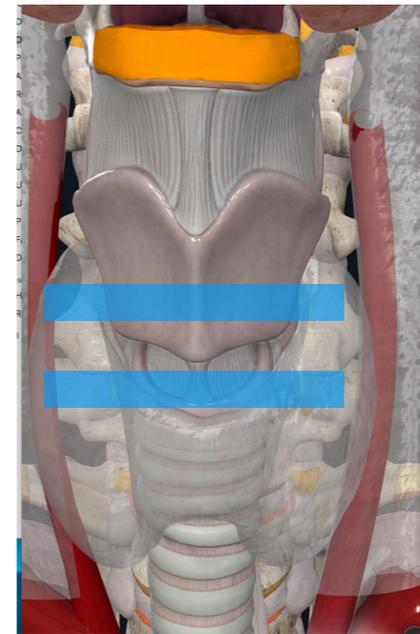
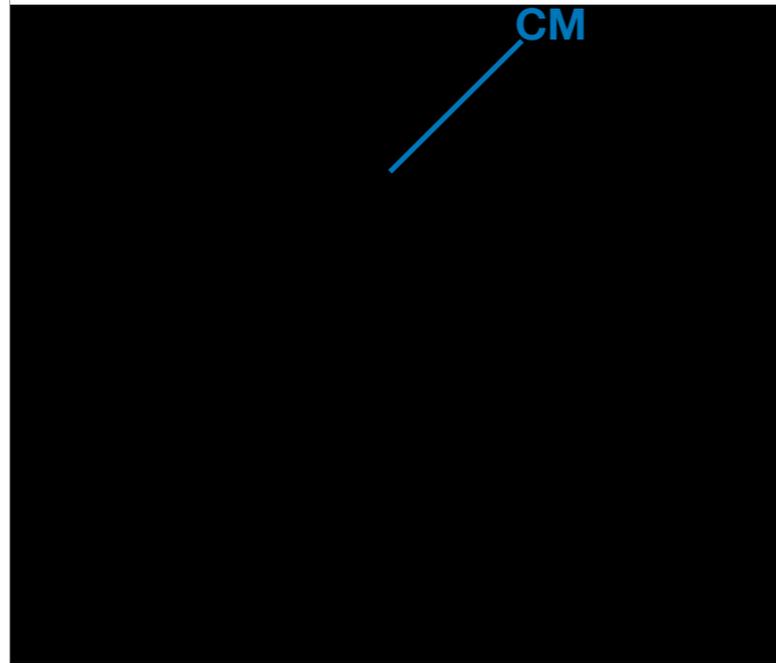
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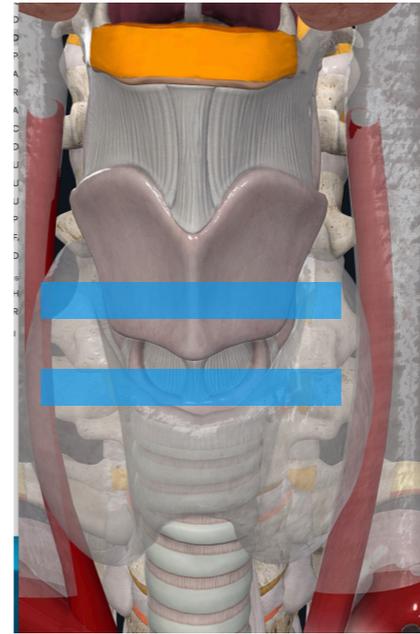
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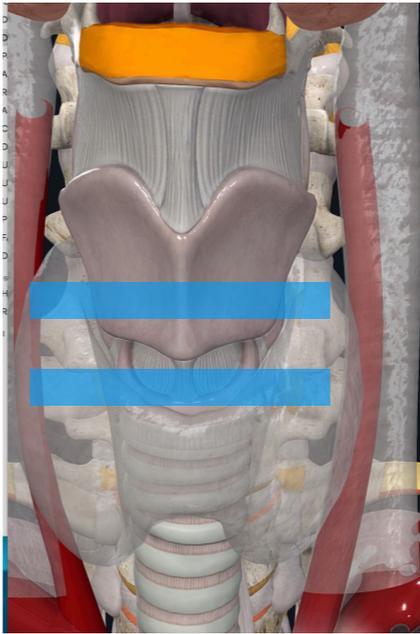
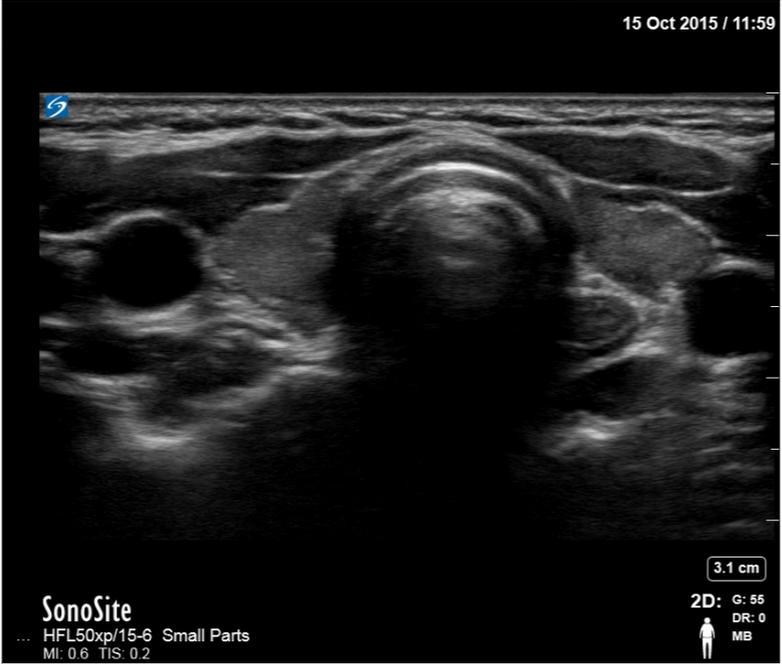
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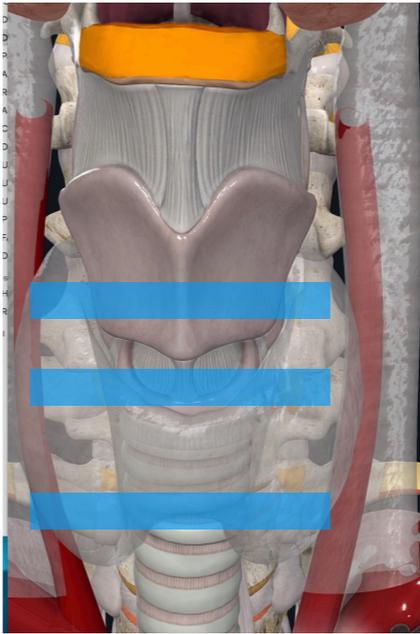
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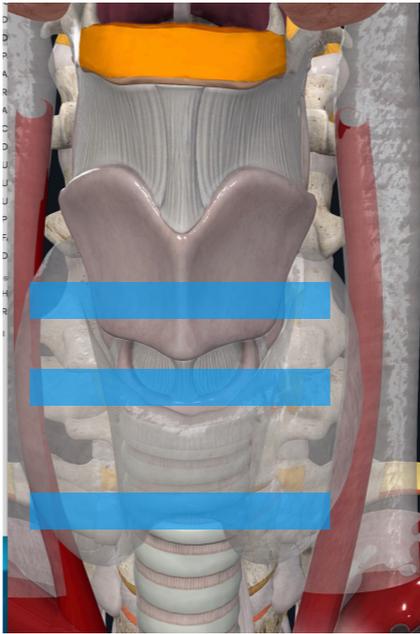
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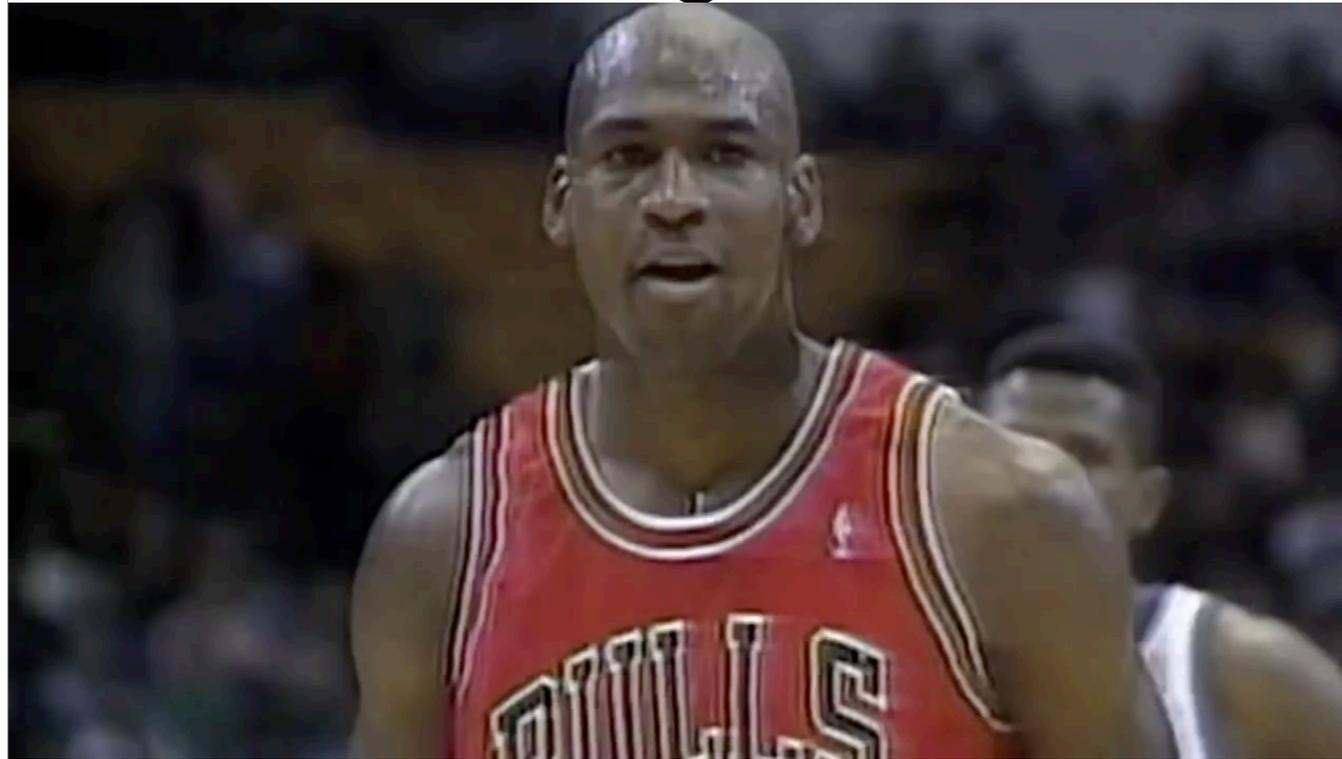
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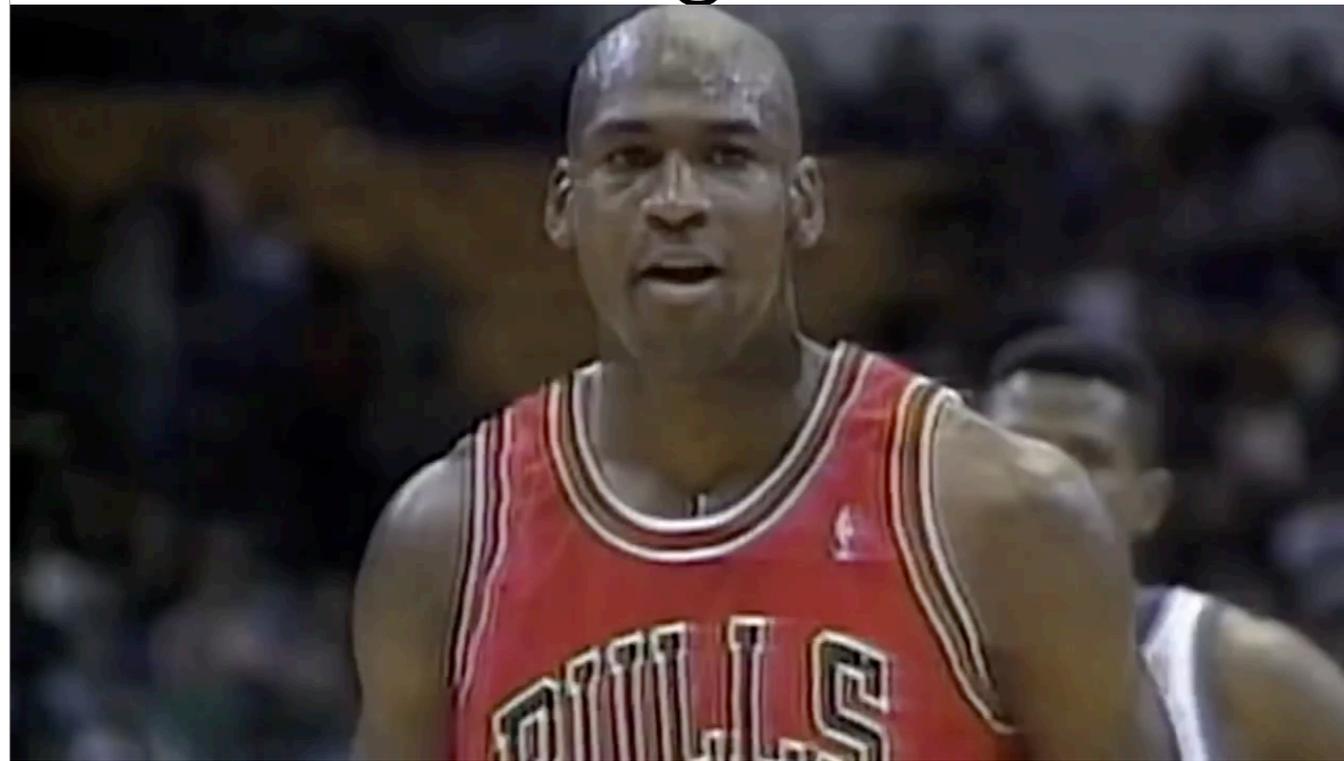


Grounding Moment



Take a lesson from one of the greatest to do it... eyes closed routine before free throws

Grounding Moment



Perimortem C-Section



Start compressions, run thru ABCs, work on securing an airway...

Fetal Survival and Maternal Survival increased with the procedure

in the past Fetal Survival >Maternal

Cross culture in Ancient Egypt, Roman, Native American Cultures; Roman Kingdom decreed all pregnant women who died—> postmortem c-section ASAP for chance at fetal survival

— infant survival rare

— English literature 14th and 15th century—> mandated physician to perform postmortem c-sections

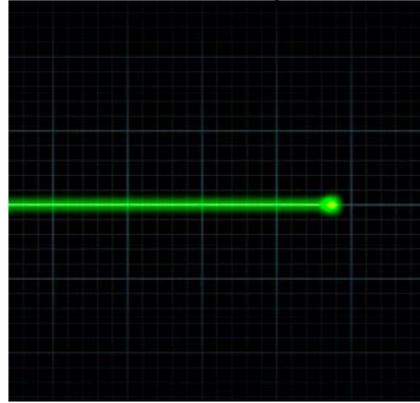
Perimortem C-Section

25 ♀ at 30 weeks s/p MVC



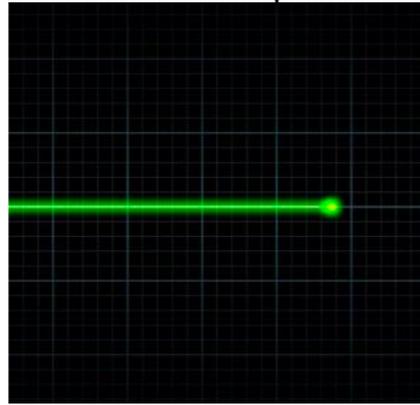
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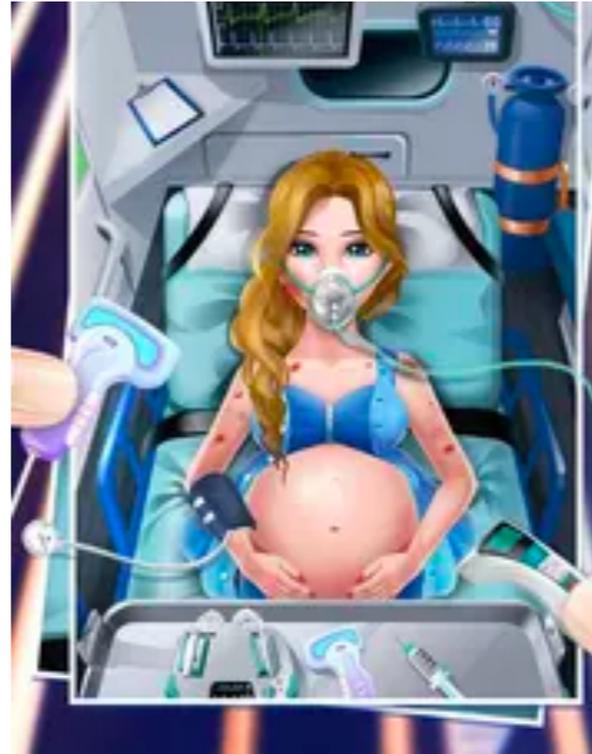
Perimortem C-Section

25 ♀ at 30 weeks s/p MVC



CPR in Pregnancy

- ABCs



Airway—> Lower Esophageal sphincter tone—> higher aspiration risks

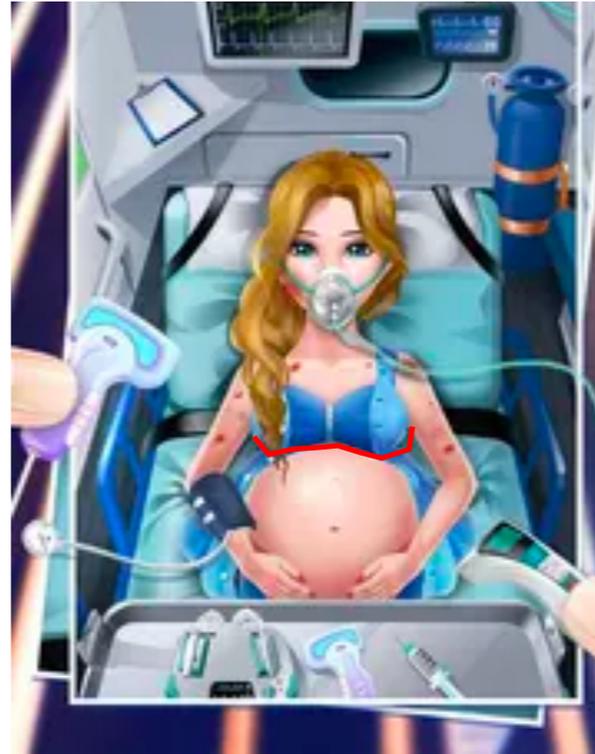
Breathing—> Lower Tolerance for Hypoxemia=>Decreased Functional Reserve Capacity w/ high diaphragm

—> Placenta increased O₂ consumption further contributes to decr tolerance for hypox & apnea

Circ—> Higher diaphragm—> compressions higher up; pad placement will also be higher: chest tube placed higher

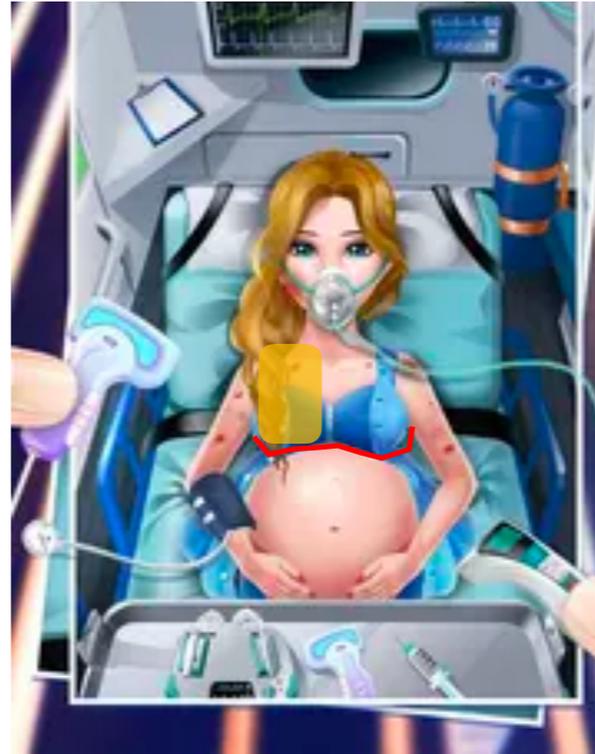
CPR in Pregnancy

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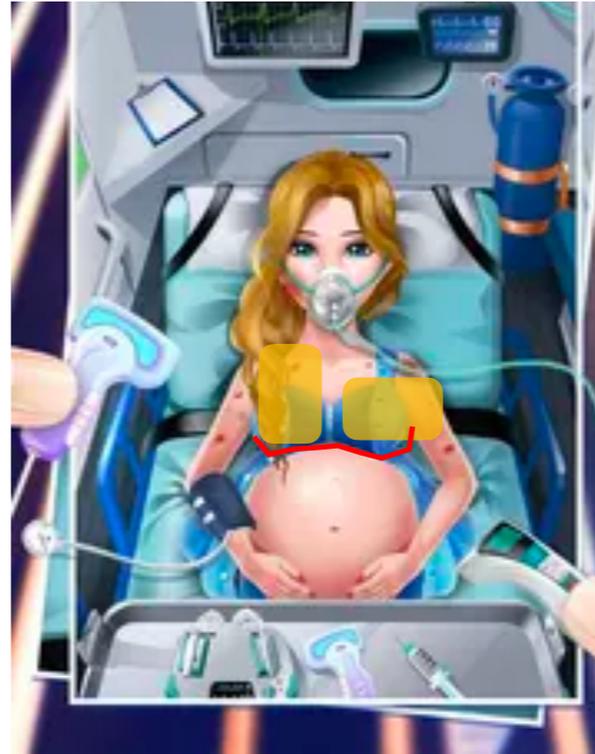
CPR in Pregnancy

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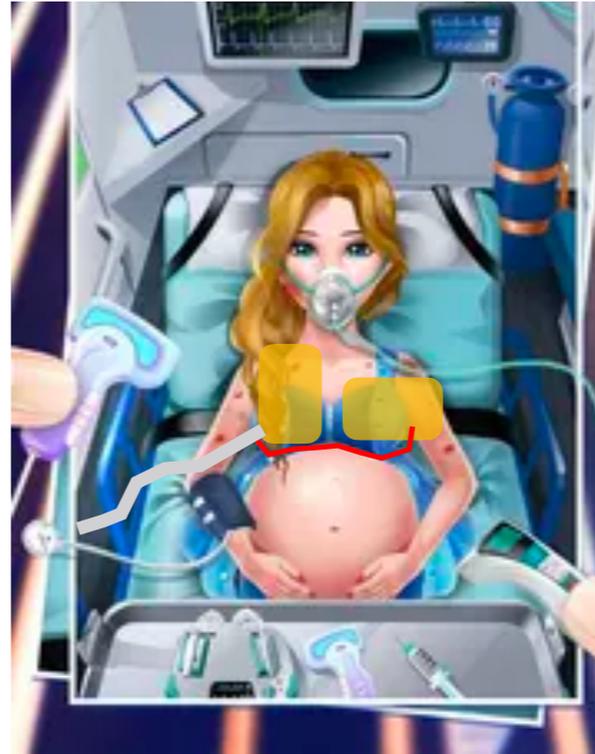
CPR in Pregnancy

- ABCs



CPR in Pregnancy

- ABCs



Positioning

Gravid Uterus >20 weeks compress IVC and prevent necessary Venous return to the heart (↓ SV by 30% supine)- early studies

We are taught to lie the pt in a LL Decub Position ≠ practical in a code situation

— you need to intubate and perform quality compressions

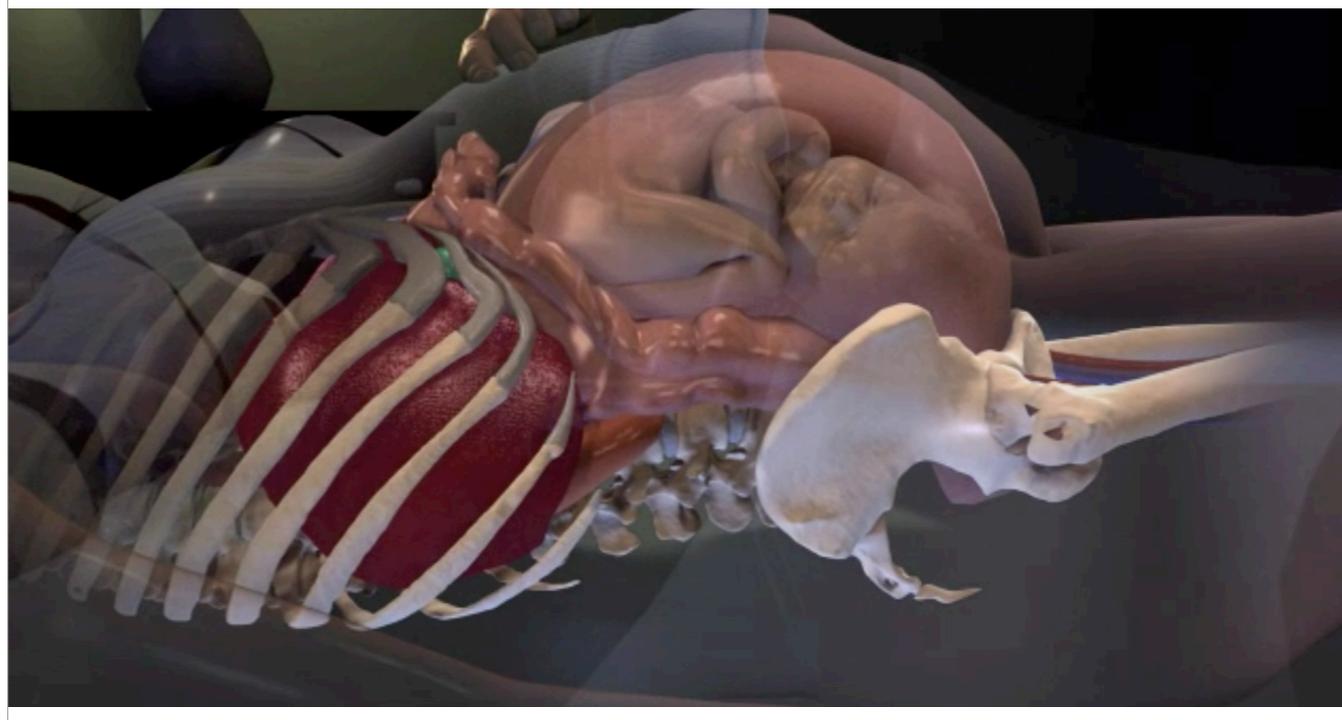
Alt #1: 30 degree tilt to allow for IVC decompression (hard to intubate and perform compressions)

Alt #2: Left Uterine Displacement (1-Handed vs 2-Handed Technique); Largely depend on how many hands you have available in the room.

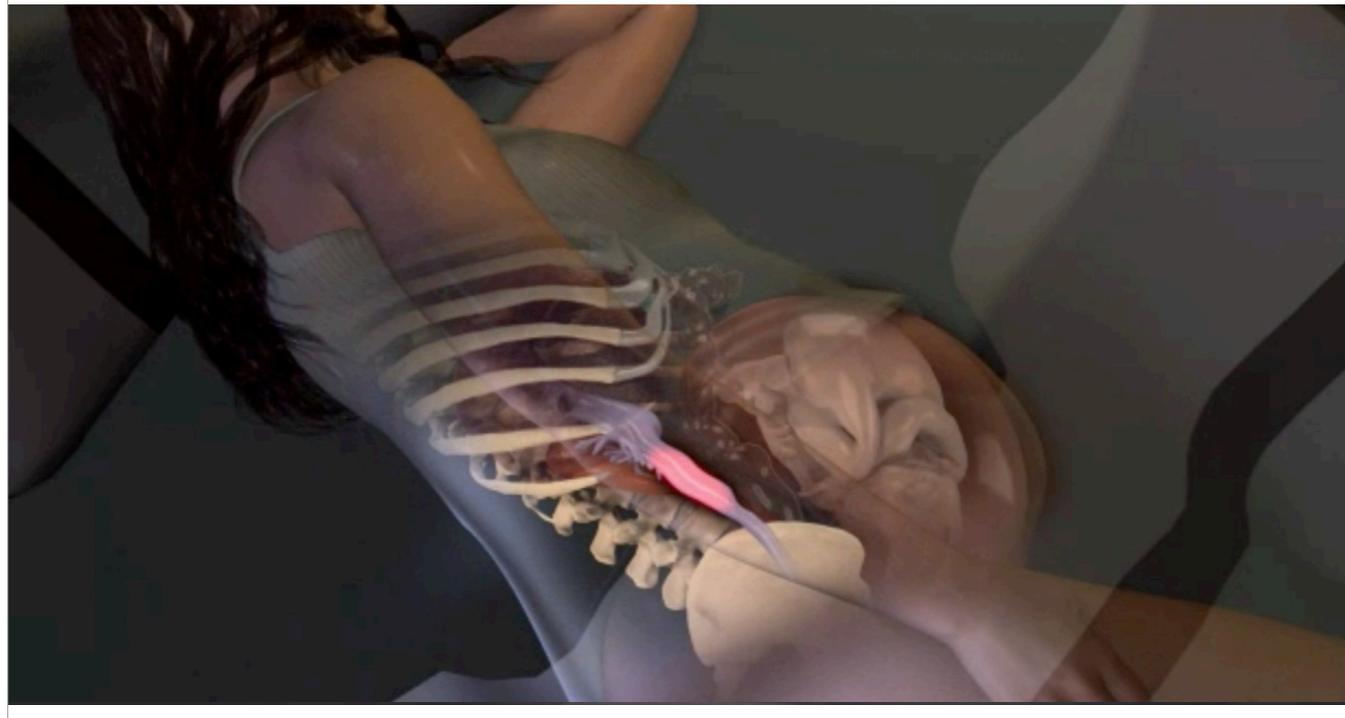
American Heart Assoc—> recommends Left Uterine Displacement

You secured airway—> started CPR—> and Left Uterine displacement==> STILL Coding

Positioning



Positioning



Positioning



Positioning

Positioning





Secured airway—> started CPR—> and Left Uterine displacement==> STILL Coding

DO I need to do a Per-mortem?==> 1st consideration—> viability

24 weeks- every institution is different; 24 weeks is a general number that most institutions agree upon... fetus \geq 24 weeks higher chances of survival and less chances of neurologic sequelae

Gravid Uterus >20 weeks causes aorto-caval compression—> Perimortem C-section provide the best opportunity to restore maternal-neonate blood flow



Peri-Mortem C-Section???



Peri-Mortem C-Section???

Peri-Mortem C-Section???

Viabile Fetus?

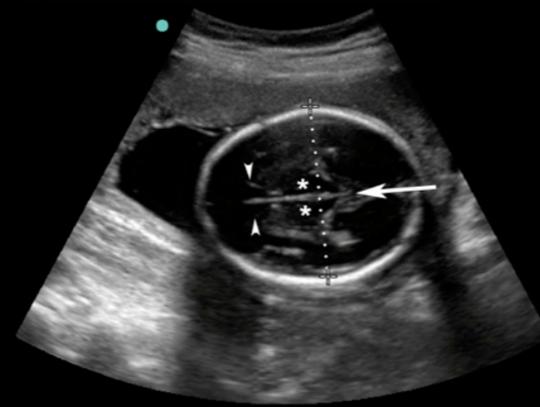
Peri-Mortem C-Section???

Viabile Fetus?

24 Weeks

Estimate Gestational Age

Biparietal Diameter (BPD)



✦ BPD 5.81cm 23w6d

● Femur Length (FL)



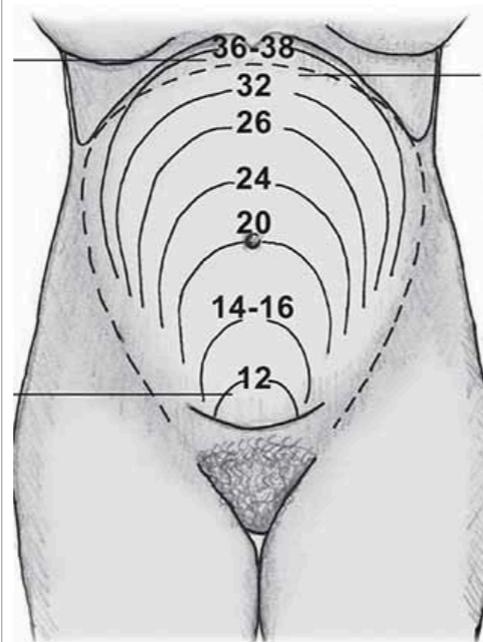
✦ FL 4.25cm 23w6d

POCUS or Palpate Fundal Height—>

Fundal Height—> (12 weeks symph; 20weeks umb; 36 (xiphoid))

Estimate Gestational Age

Estimate Gestational Age



Time Since Arrest

2nd consideration= Time Since Arrest

Original Study 1986

—61 Total cases reviewed at that time==> called postmortem Csxn
<5 min—> improved infant survival & decr neurological sequelae

2005 reviewed the literature over 30 yrs (from 1985-2004)—> supported the recommendation

AHA Recommendations==> retrospective review 30 years of cases agree 5 min have better neonatal outcomes

- Though recommendation start in 4 min==> practical/reality takes a few minutes to get what you need, start CPR, get materials

-noted **neonatal survival up to 30 min post-arrest**

-maternal benefit and neonatal survival with **PMCD w/in 10 min (on avg time it takes)**

-BOTTOMline: Outcomes improved with quicker PMCD times.

— old literature from 1930s much higher rates of maternal death (Cholera, TB, Infections, Anesthesia complications)

Cross culture in Ancient Egypt, Roman, Native American Cultures; Roman Kingdom decreed all pregnant women who died—> postmortem c-section ASAP for chance at fetal survival—> poor infant survival rates—>— Preg women at greater risk for anoxic brain injury—> decr Functional Reserve Capacity

Time Since Arrest

Table 2. Postmortem Cesarean Deliveries With Surviving Infants With Reports of Time From Death of the Mother Until Delivery (From 1900–1985)

| Cases | No. patients | Percent |
|-----------|--------------------------------|---------|
| 0–5 min | 42 (normal infants) | 70 |
| 6–10 min | 7 (normal infants) | 13 |
| | 1 (mild neurologic sequelae) | |
| Subtotal | 8 | |
| 11–15 min | 6 (normal infants) | 12 |
| | 1 (severe neurologic sequelae) | |
| Subtotal | 7 | |
| 16–20 min | 1 (severe neurologic sequelae) | 1.7 |
| 21+ min | 2 (severe neurologic sequelae) | |
| | 1 (normal infant) | 3.3 |
| Subtotal | 3 | |
| Total | 61 | 100 |

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Time Since Arrest

Time Since Arrest

American Journal of Obstetrics and Gynecology (2005) 192, 1916–21



ELSEVIER

American Journal of
OBSTETRICS and
GYNECOLOGY

www.ajog.org

Perimortem cesarean delivery: Were our assumptions correct?

Vern Katz, MD,^{a,*} Keith Balderston, MD,^a Melissa DeFreest, MD^b

Time Since Arrest

AHA Scientific Statement

Cardiac Arrest in Pregnancy

A Scientific Statement From the American Heart Association

Farida M. Jeejeebhoy, MD, Chair; Carolyn M. Zelop, MD; Steve Lipman, MD; Brendan Carvalho, MD; Jose Joglar, MD; Jill M. Mhyre, MD; Vern L. Katz, MD; Stephen E. Lapinsky, MB BCh, MSc; Sharon Einav, MD; Carole A. Warnes, MD; Richard L. Page, MD; Russell E. Griffin, LP, FP-C; Amish Jain, MD; Katie N. Dainty, PhD; Julie Arafah, RN, MS; Rory Windrim, MD; Gideon Koren, MD; Clifton W. Callaway, MD, PhD; on behalf of the American Heart Association Emergency Cardiovascular Care Committee, Council on Cardiopulmonary, Critical Care, Perioperative and Resuscitation, Council on Cardiovascular Diseases in the Young, and Council on Clinical Cardiology

Time Since Arrest

AHA Scientific Statement

Cardiac Arrest in Pregnancy

A Scientific Statement From the American Heart Association

Farida M. Jeejeebhoy, MD, Chair; Carolyn M. Zelop, MD; Steve Lipman, MD; Brendan Carvalho, MD; Jose Joglar, MD; Jill M. Mhyre, MD; Vern L. Katz, MD; Stephen E. Lapinsky, MB BCh, MSc; Sharon Einav, MD; Carole A. Warnes, MD; Richard L. Page, MD; Russell E. Griffin, LP, FP-C; Amish Jain, MD; Katie N. Dainty, PhD; Julie Arafah, RN, MS; Rory Windrim, MD; Gideon Koren, MD; Clifton W. Callaway, MD, PhD; on behalf of the American Heart Association Emergency Cardiovascular Care Committee, Council on Cardiopulmonary, Critical Care, Perioperative and Resuscitation, Council on Cardiovascular Diseases in the Young, and Council on Clinical Cardiology

4 minutes

Perimortem C-Section

WILL NEED 3 TEAMS

Perimortem C-Section

3 Teams

Perimortem C-Section

3 Teams

ACLS

Perimortem C-Section

3 Teams

ACLS



Perimortem C-Section

3 Teams

ACLS

C-Sxn



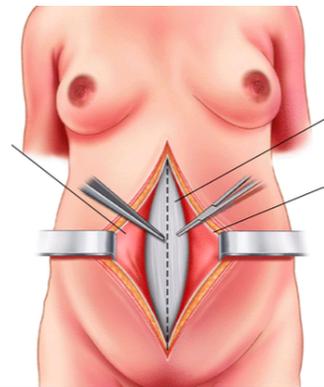
Perimortem C-Section

3 Teams

ACLS



C-Sxn



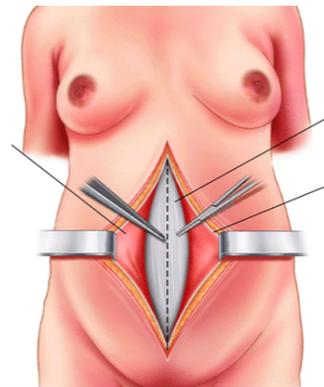
Perimortem C-Section

3 Teams

ACLS



C-Sxn



Neonatal

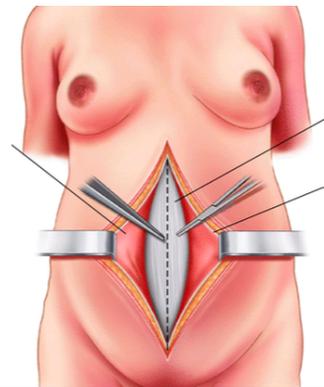
Perimortem C-Section

3 Teams

ACLS



C-Sxn



Neonatal



Equipment

Betadine splash and scalpel are all that is needed to get started- AHA recommends not delaying for additional equipment
Equipment that is helpful—> Scissors, Towels for packing, Kelly Clamps for the umbilical cord
Chest Tray—> easily accessible and has all of these pieces of equipment!!!

Equipment



Equipment

Equipment



Equipment



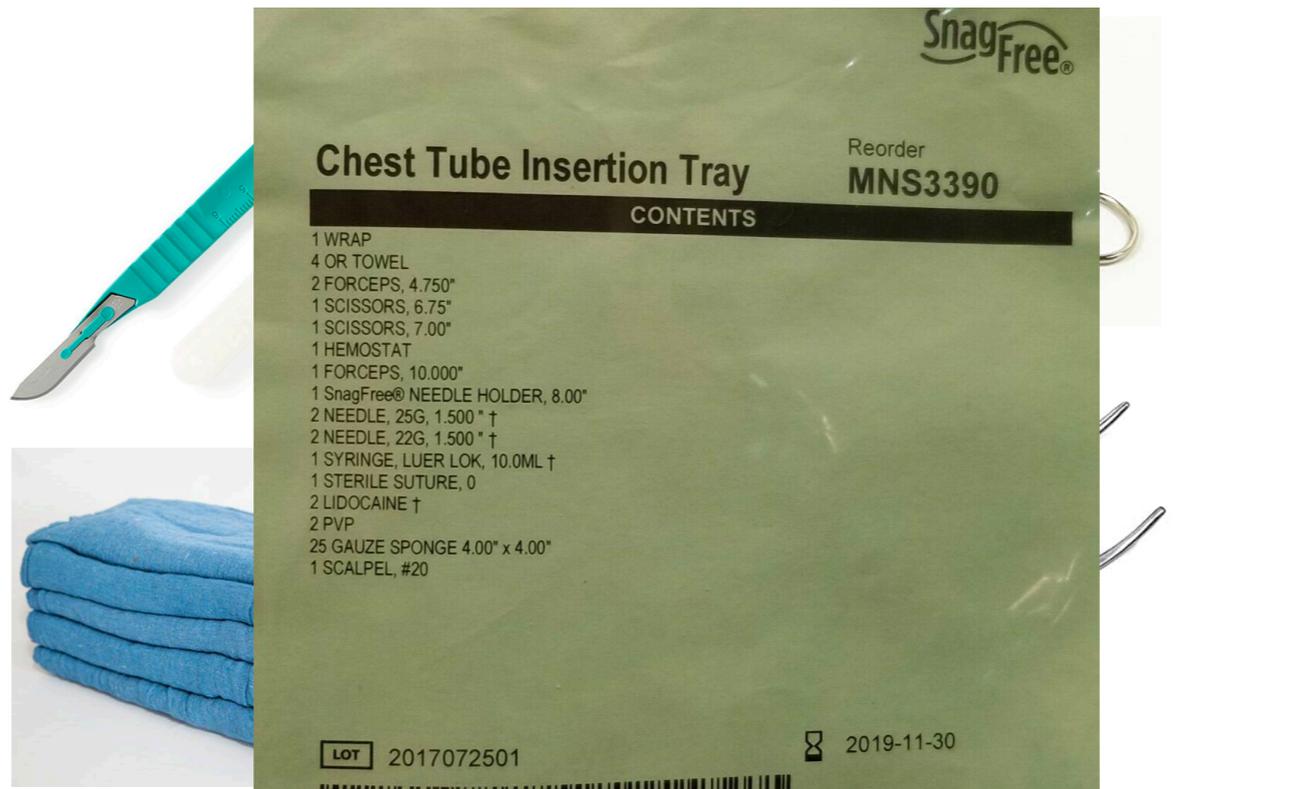
Equipment



Equipment



Equipment



SnagFree®

Chest Tube Insertion Tray Reorder **MNS3390**

CONTENTS

- 1 WRAP
- 4 OR TOWEL
- 2 FORCEPS, 4.75"
- 1 SCISSORS, 6.75"
- 1 SCISSORS, 7.00"
- 1 HEMOSTAT
- 1 FORCEPS, 10.000"
- 1 SnagFree® NEEDLE HOLDER, 8.00"
- 2 NEEDLE, 25G, 1.500" †
- 2 NEEDLE, 22G, 1.500" †
- 1 SYRINGE, LUER LOK, 10.0ML †
- 1 STERILE SUTURE, 0
- 2 LIDOCAINE †
- 2 PVP
- 25 GAUZE SPONGE 4.00" x 4.00"
- 1 SCALPEL, #20

LOT 2017072501  2019-11-30



Equipment



Procedure



NOT A COSMETIC PROCEDURE—> LIFE-SAVING after all prior measures (ABCs; uterine displacement)

LARGE Incision (AGGRO)—> vertical (subxiphoid to the pubic symphysis)

Scissors to cut through the rectus abdominus or can use scalpel

Once thru rectus abdominus—> staring at uterus (bowel displaced)—> can be helpful to remove bladder out of the way

5cm Vertical incision of the lower uterine segment (thinner walled)—> amniotic fluid will egress—>

Scissors with Dom hand and use other hand to protect the fetus, extend the incision to the uterine fundus

Deliver baby with assistance of fundal pressure—> clamp cord—> deliver placenta

GOAL==> restore maternal-fetal circulxn (relieving aorto-caval compression)==> get ROSC—> no need for fancy closure

Pack the uterus and abdomen—> all 4 quadrants w/ Towels

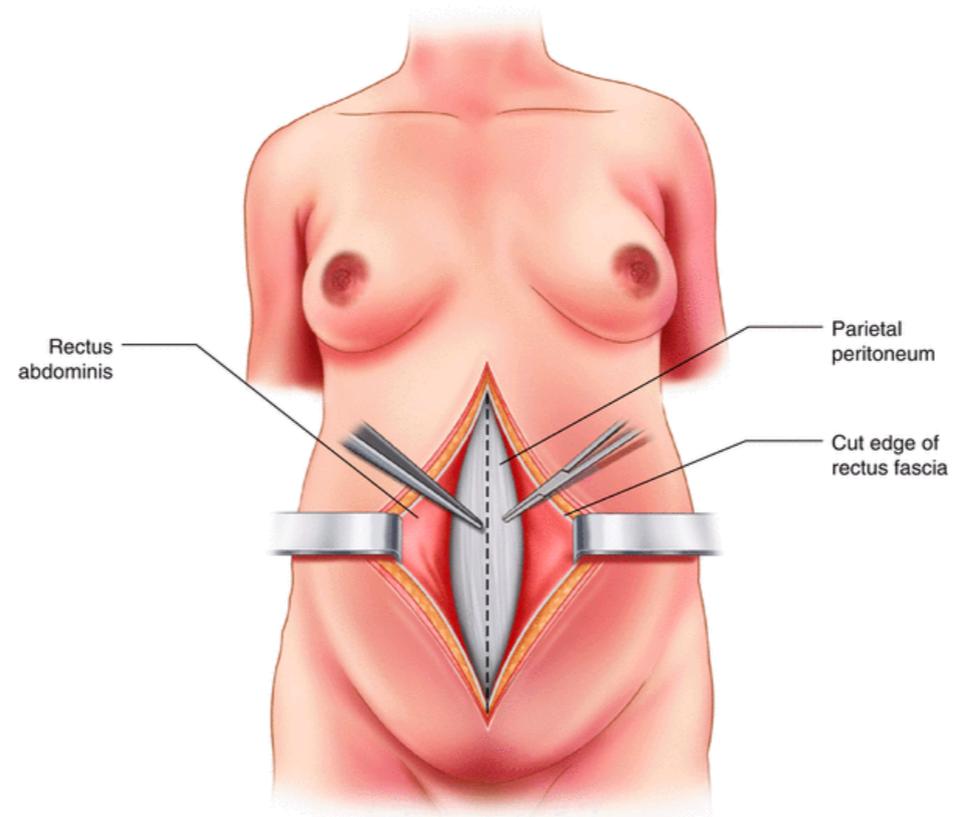
Don't have to worry about a serious closure—> can loosely staple

Procedure

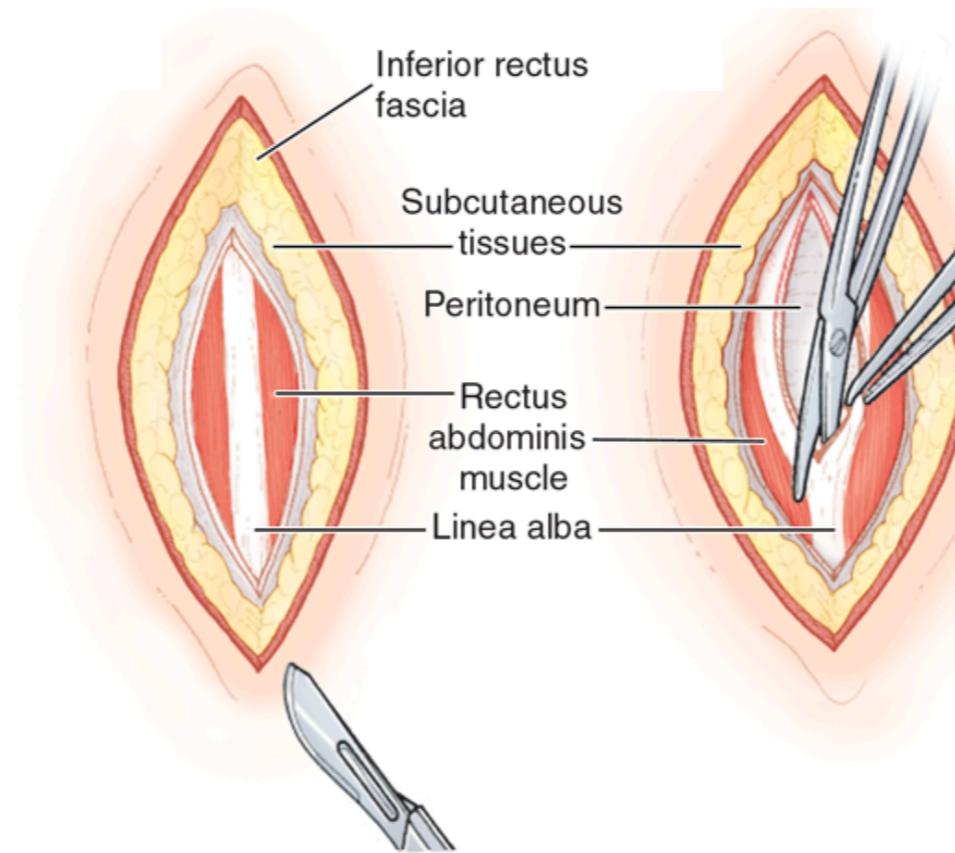


Procedure

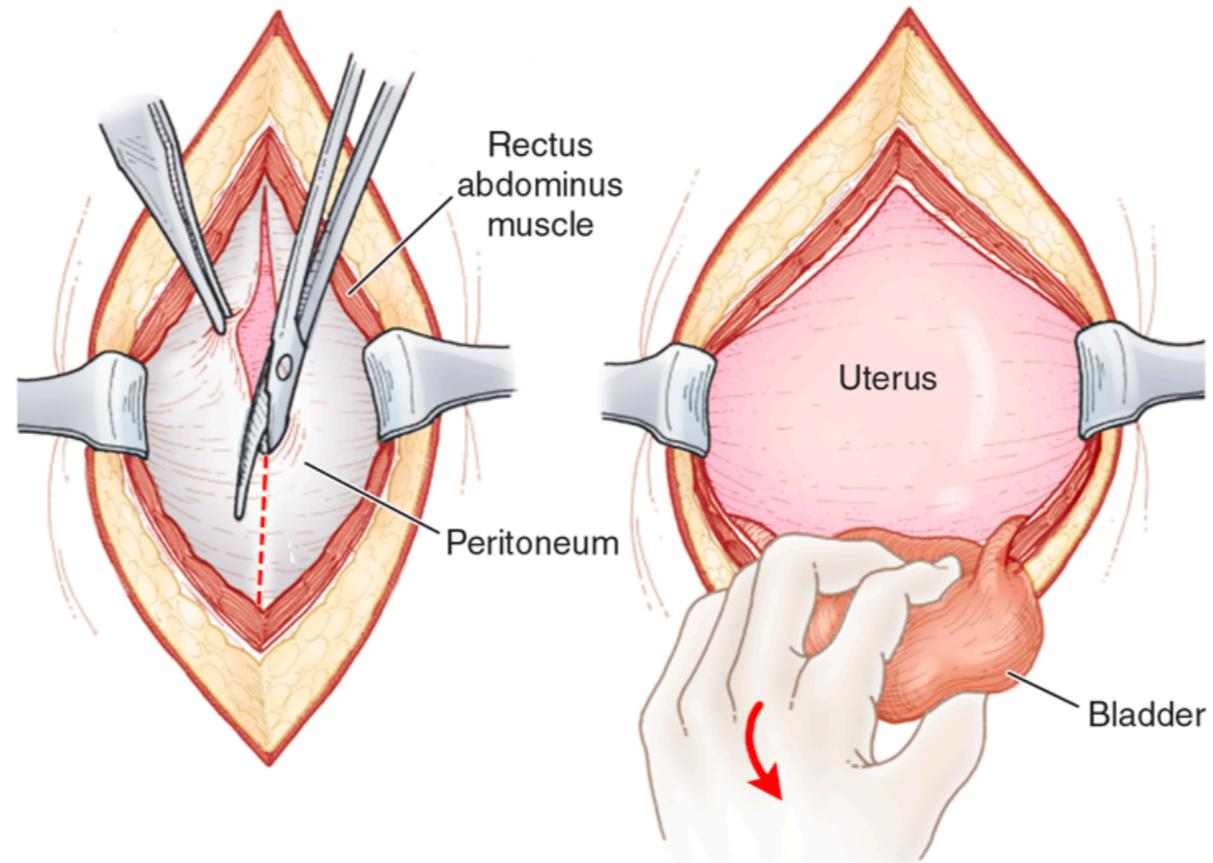
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Procedure

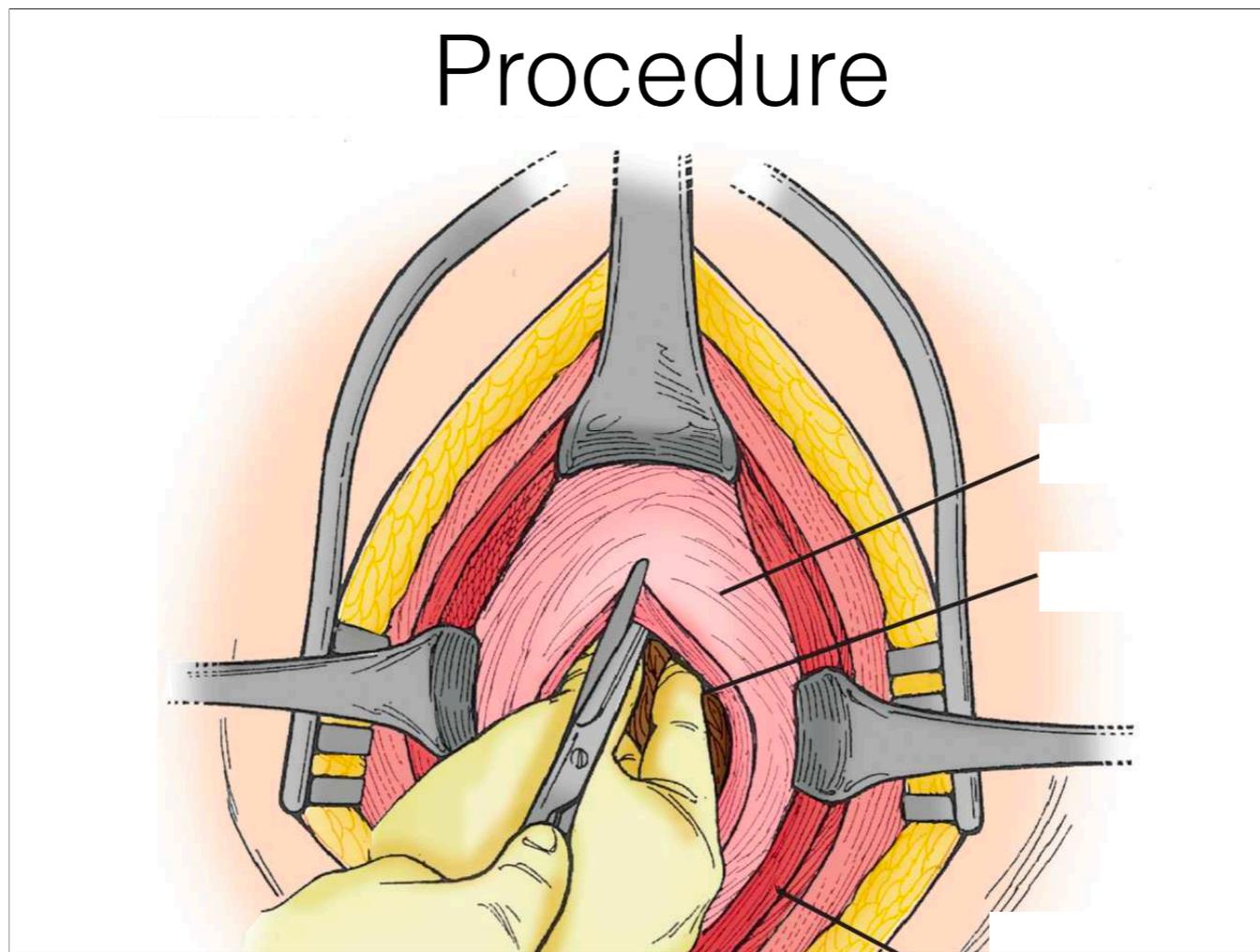


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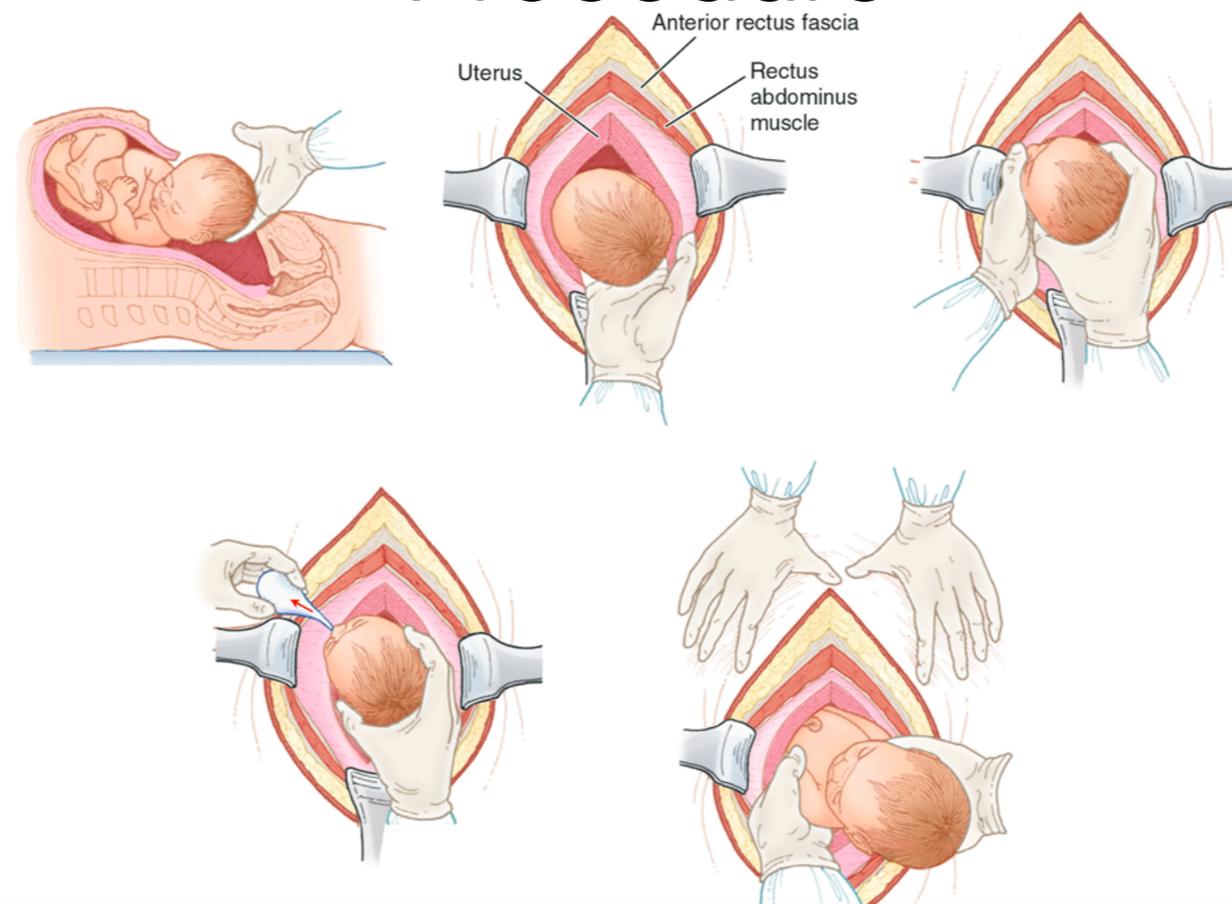


Procedure

Procedure



Procedure



Procedure

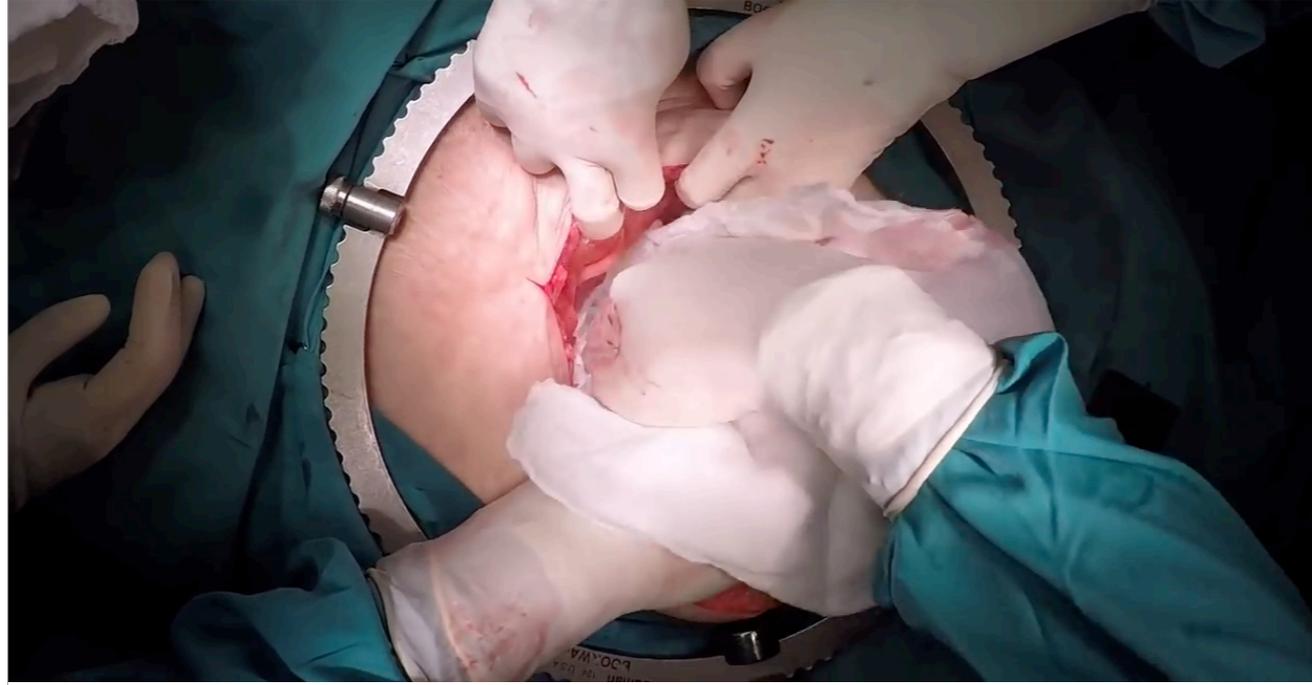
Procedure



Procedure



Procedure



Perimortem C-Section

Review:

Who: >24 weeks, arrest, 4min despite positioning and CPR

Procedure:

After deliver fetus & placenta looking for ROSC—> packing>>loose closure (not plastic surgery!)

Perimortem C-Section

Who?

Perimortem C-Section

Who?

Perimortem C-Section

Who?

- >24 weeks EGA

Perimortem C-Section

Who?

- >24 weeks EGA
- Cardiac Arrest

Perimortem C-Section

Who?

- >24 weeks EGA
- Cardiac Arrest
 - 4 min (despite ACLS & Positioning)

Perimortem C-Section

Who?

- >24 weeks EGA
- Cardiac Arrest
 - 4 min (despite ACLS & Positioning)
- 3 Teams

Perimortem C-Section

Who?

- >24 weeks EGA
- Cardiac Arrest
 - 4 min (despite ACLS & Positioning)
- 3 Teams
 - ACLS

Perimortem C-Section

Who?

- >24 weeks EGA
- Cardiac Arrest
 - 4 min (despite ACLS & Positioning)
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Perimortem C-Section

Who?

- >24 weeks EGA
- Cardiac Arrest
 - 4 min (despite ACLS & Positioning)
- 3 Teams
 - ACLS
 - C-Sxn
 - Neonatal

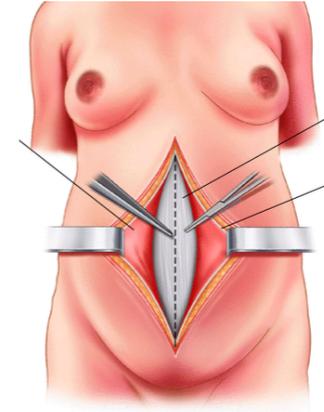
Perimortem C-Section

Perimortem C-Section

Procedure

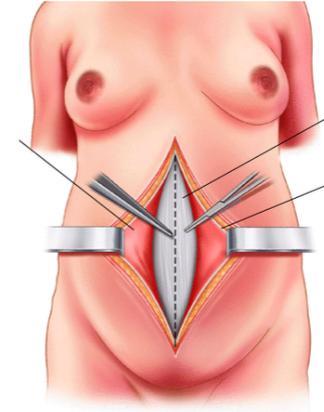
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Procedure



Perimortem C-Section

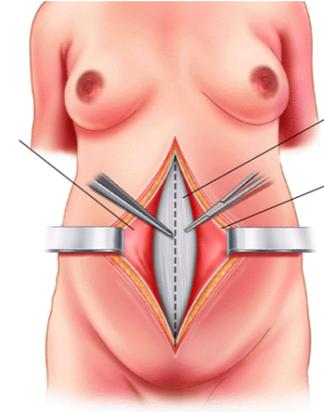
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Perimortem C-Section

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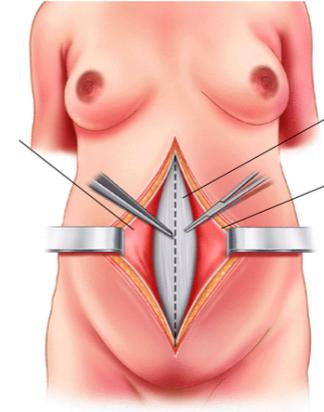
- Vertical Incision
- Subxiphoid to pubic symphysis



Perimortem C-Section

Procedure

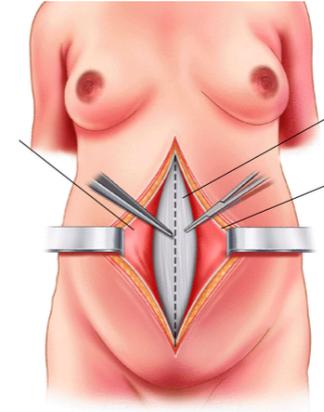
- Vertical Incision
 - Subxiphoid to pubic symphysis
- Vertical Uterine Incision
 - Extend with scissors



Perimortem C-Section

Procedure

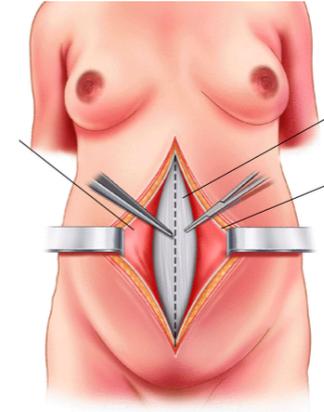
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 - Extend with scissors
- Deliver Fetus (Fundal Pressure)



Perimortem C-Section

Procedure

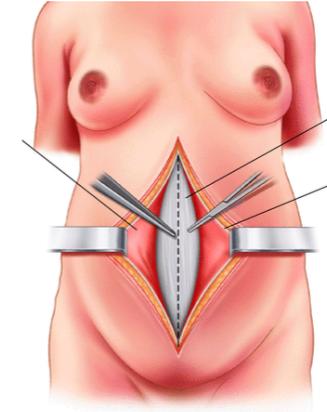
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- Deliver Fetus (Fundal Pressure)
- Deliver Placenta



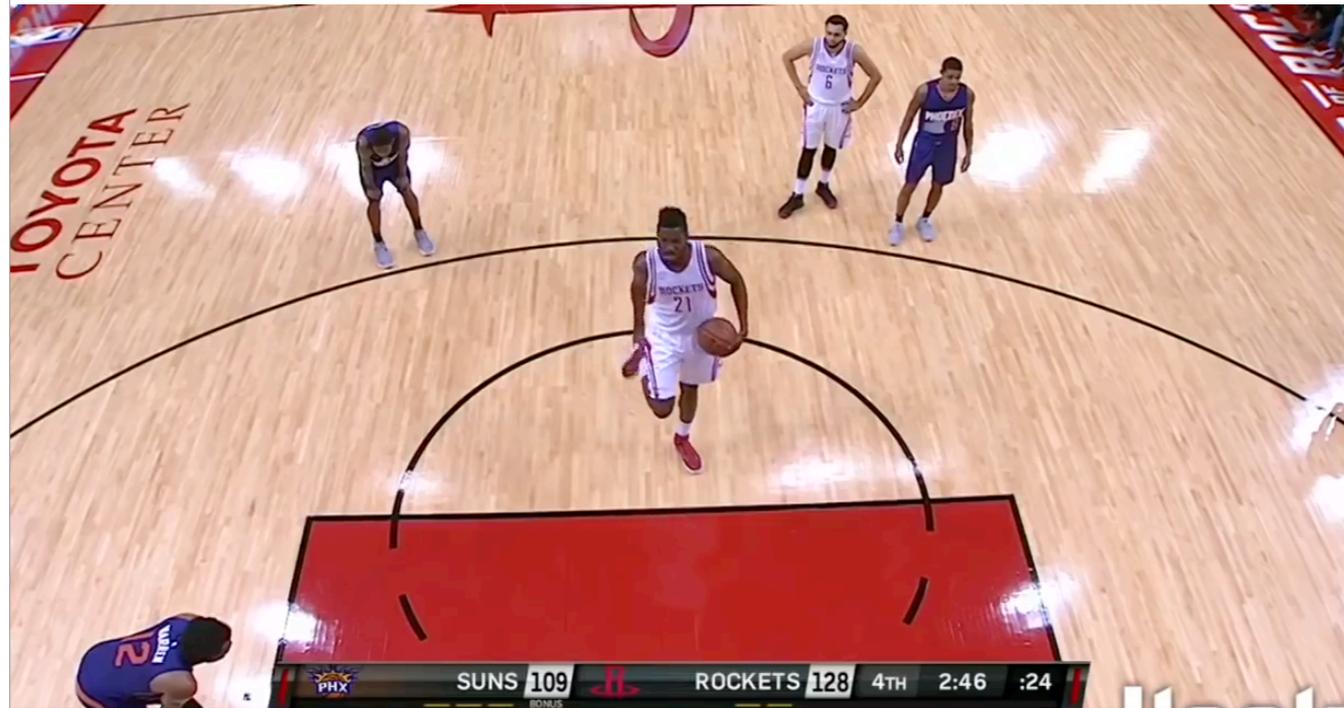
Perimortem C-Section

Procedure

- Vertical Incision
 - Subxiphoid to pubic symphysis
- Vertical Uterine Incision
 - Extend with scissors
- Deliver Fetus (Fundal Pressure)
- Deliver Placenta
- Abdominal Packing/Loose Closure

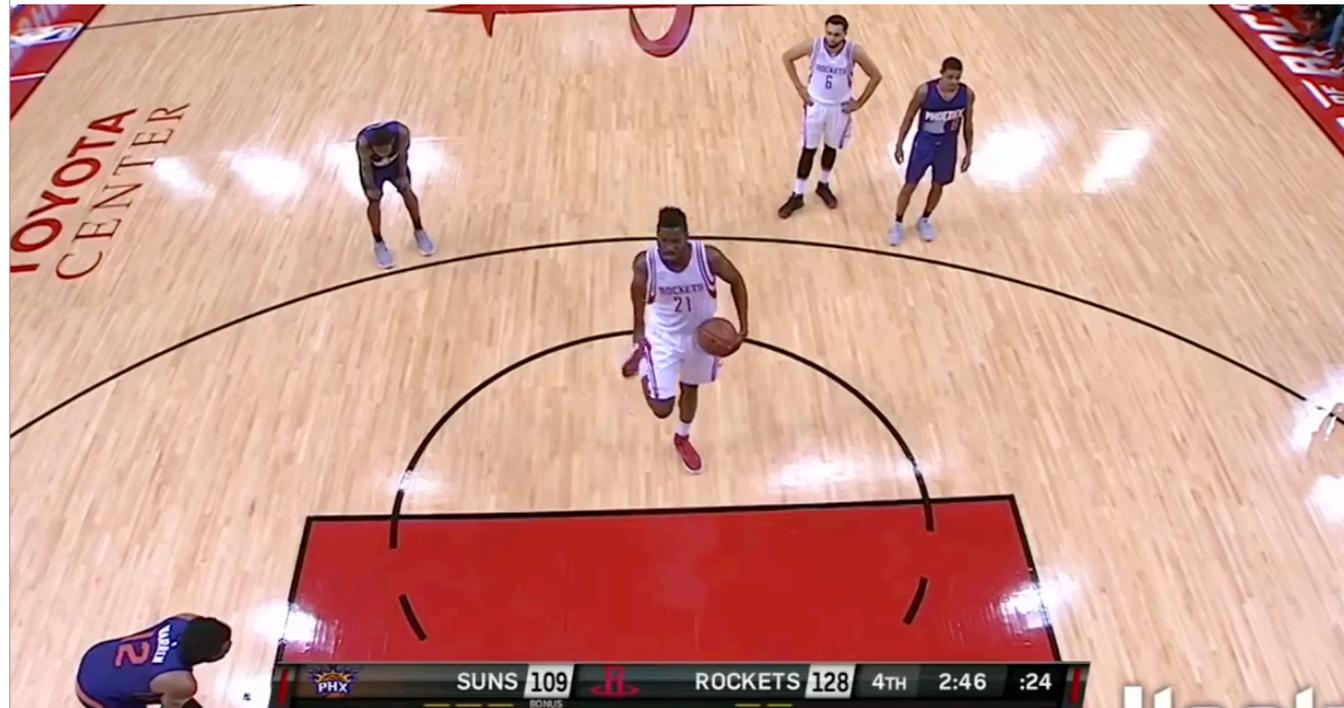


Grounding Moment



Chinanu Onuaku (Rockets)- revived the underhand free throw in 2017
OLD school shooting technique- known to be more efficient (not pretty)—> similar to Thorocatomy
—->Not pretty but gets the job done

Grounding Moment



Case



- EMS: "CODE 3 Trauma"
- 24 Male BIBA with SW to Left chest
 - Hypotensive and Tachycardic

Case



- EMS: "CODE 3 Trauma"
- 24 Male BIBA with SW to Left chest
- Hypotensive and Tachycardic



Goals

Usually pts with significant thoracoabd trauma who have just lost pulses

Relieve large HTX, Relieving Cardiac Tamponade

Support Cardiac Function

- Manual Compression

- Internal Defibrillation

Control Hemorrhage

- Cardiac, Pulm Vessels, Great Vessels, hemoperitoneum

Goals

1. Restore Cardiac Output
 - Relieve Cardiac Tamponade
 - Support Cardiac Function
2. Control Hemorrhage

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Goals

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Goals

1. Restore Cardiac Output
 - Relieve Cardiac Tamponade
 - Support Cardiac Function
2. Control Hemorrhage



Who?

Who?

Penetrating
Traumatic Arrests



Blunt Traumatic
Arrests



<15 min post-arrest or Impending Arrest



WHO HAS THE BEST OUTCOMES AND WHO SHOULD WE DO THIS ON?

1) MECH OF INJURY=> Penetrating >Blunt (OR 2)

— — —-SW>>GSW (OR 5)

2) LOCATION OF INJURY=> Thorax>abd>polytrauma

3) SOL in ED (OR 5)

BEST OUTCOMES=> SW to chest trauma with cardiac injury and SOL in ED!!!!

FUTILE—No SOL in the field—> non-survivable injuries;

Denver and SF—> Survivors

A systematic review of 3251 emergency department thoracotomies: is it time for a national database?

**Edward John Nevins¹ · Nicholas Thomas Edward Bird¹ · Hassan Zakria Malik^{2,3} · Simon Jude Mercer^{2,4} ·
Khalid Shahzad^{1,2} · Raimundas Lunevicius^{1,2} · John Vincent Taylor^{1,2} · Nikhil Misra^{1,2}**

Received: 15 April 2018 / Accepted: 10 July 2018 / Published online: 14 July 2018
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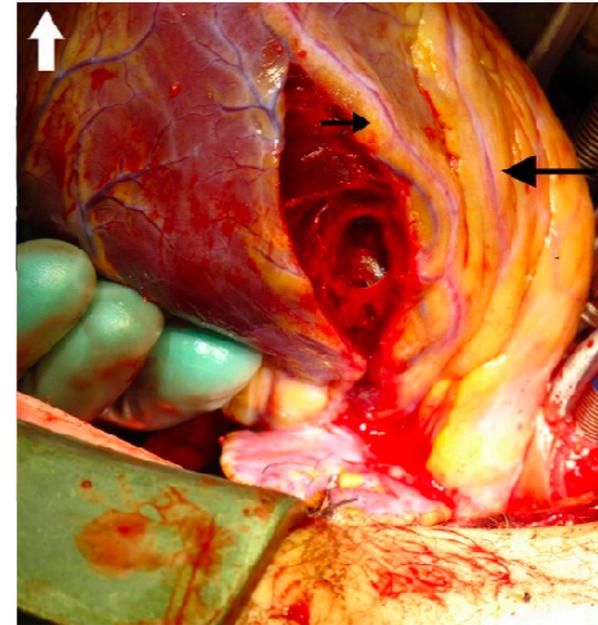
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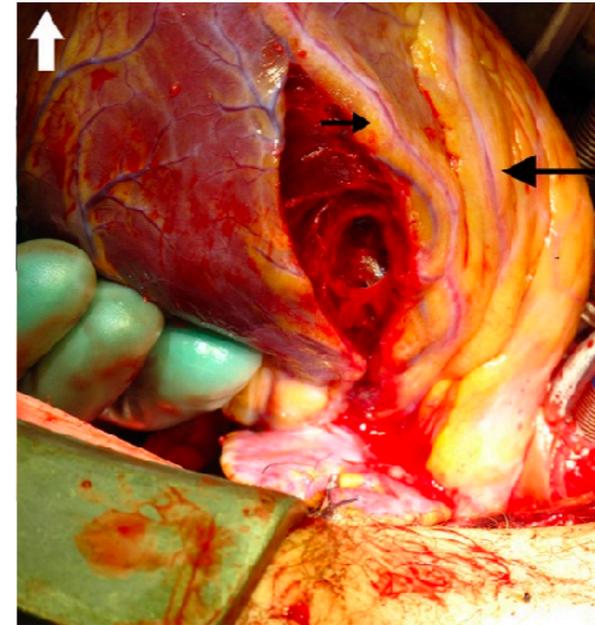
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- Signs of Life (SOL)
 - SOL in ED
- FUTILE: Blunt Trauma without SOL in field



PPE



Max PPE

FAST

FAST helpful in unstable penetrating trauma pts

ANYONE with thoracic trauma—> adjust the order of FAST—> look for most life threatening injuries 1st!

FAST



FAST

1. Cardiac View
2. Pulmonary Views
3. RUQ View
4. LUQ View
5. Pelvic View



FAST

1. Cardiac View
2. Pulmonary Views
3. RUQ View
4. LUQ View
5. Pelvic View



FAST



Think of how helpful it can be to know of pericardial effusion B4 a pt codes from their trauma in the ED

Anyone with penetrating chest trauma==>Important to look at heart->pulm-> abd

Rate of accumulation > Size of effusion

FAST



FAST



Incision



First Incision: Sternum to posterior axillary line, curve once you reach the anterior axillary line
—If you gave a humeral I/O in your left shoulder—> you will lose it. Ensure that you have other access if deciding to perform EDT.

Scissors through intercostal muscles
Rib spreader with handle down towards floor

If the arrest was 2/2 large HTX—> relieved by large incision
If not—> continue to the heart

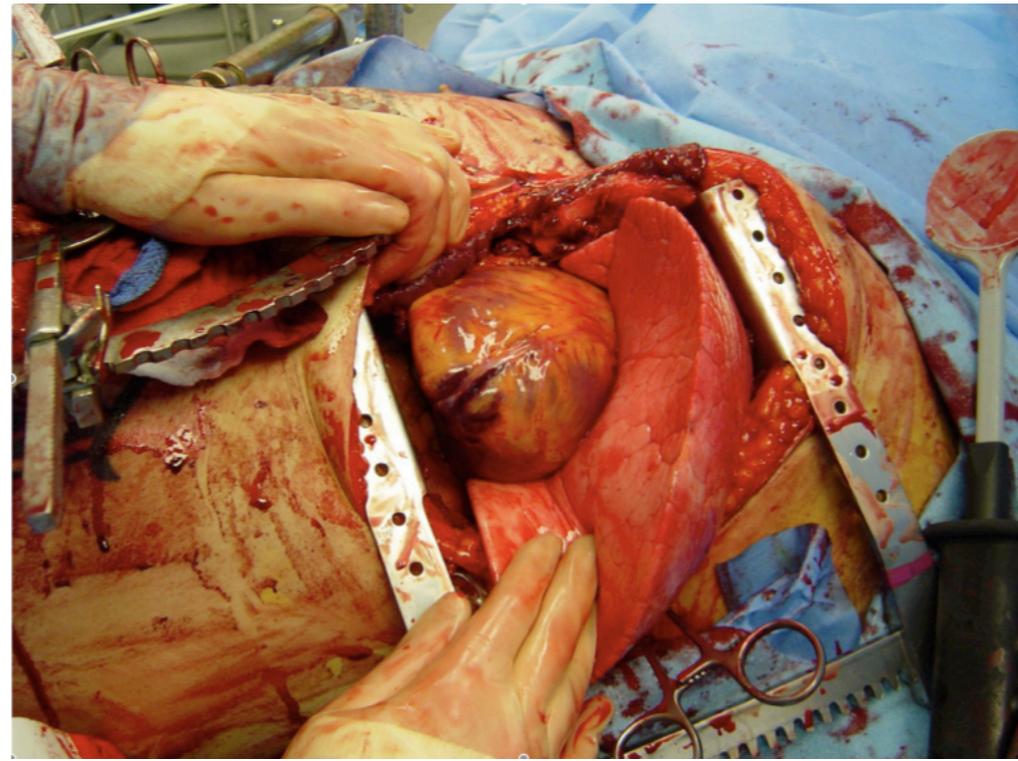
Incision



Pericardotomy

- Heart is slippery. Placing a finger is sufficient
- Other options: foley catheter; staple; stitches—> I reserve those for surgeons: finger pressure
- Described in literature—> intentional fibrillation to allow for cardiac wound repair-never done

Pericardotomy



Pericardotomy

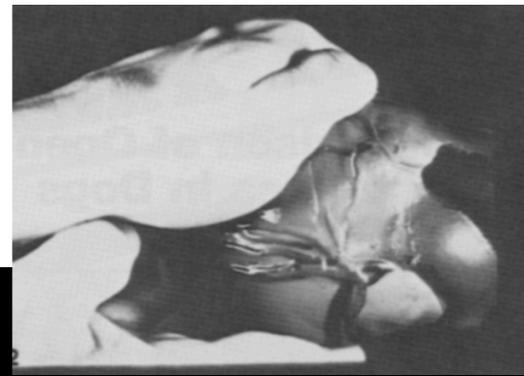
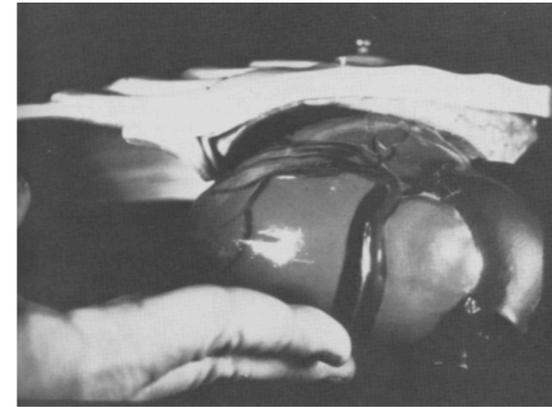
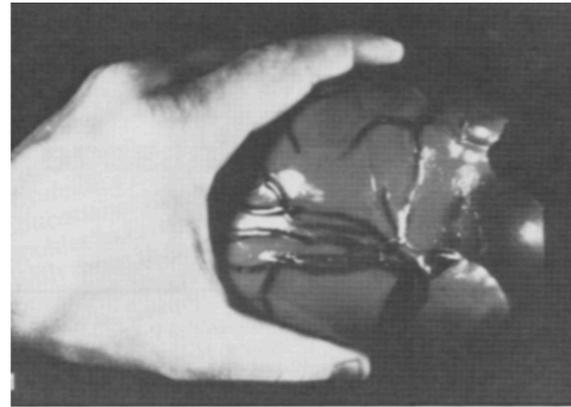
Pericardotomy



Pericardotomy



Cardiac Massage



Cardiac Massage

1-hand vs 1-hand assisted vs 2-handed (heart squeezed from the apex upward)

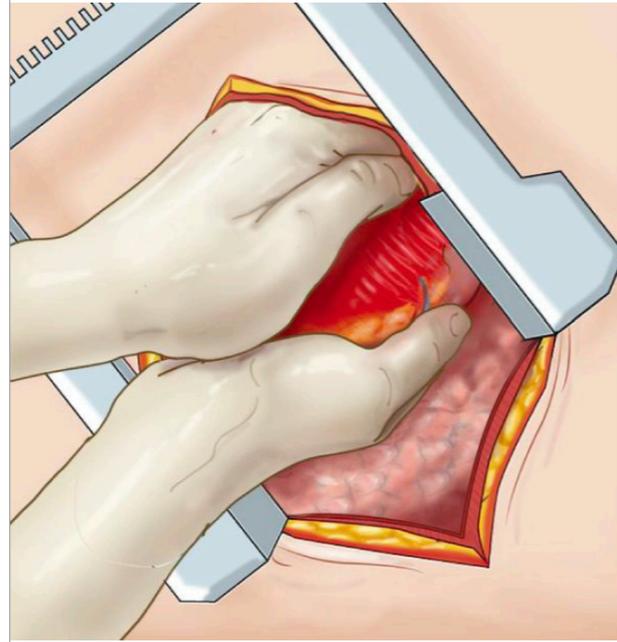
Two Handed Technique preferred—>Superior in sBP, dBP and cerebral perfusion

Defibrillation—> How many joules (20 J)

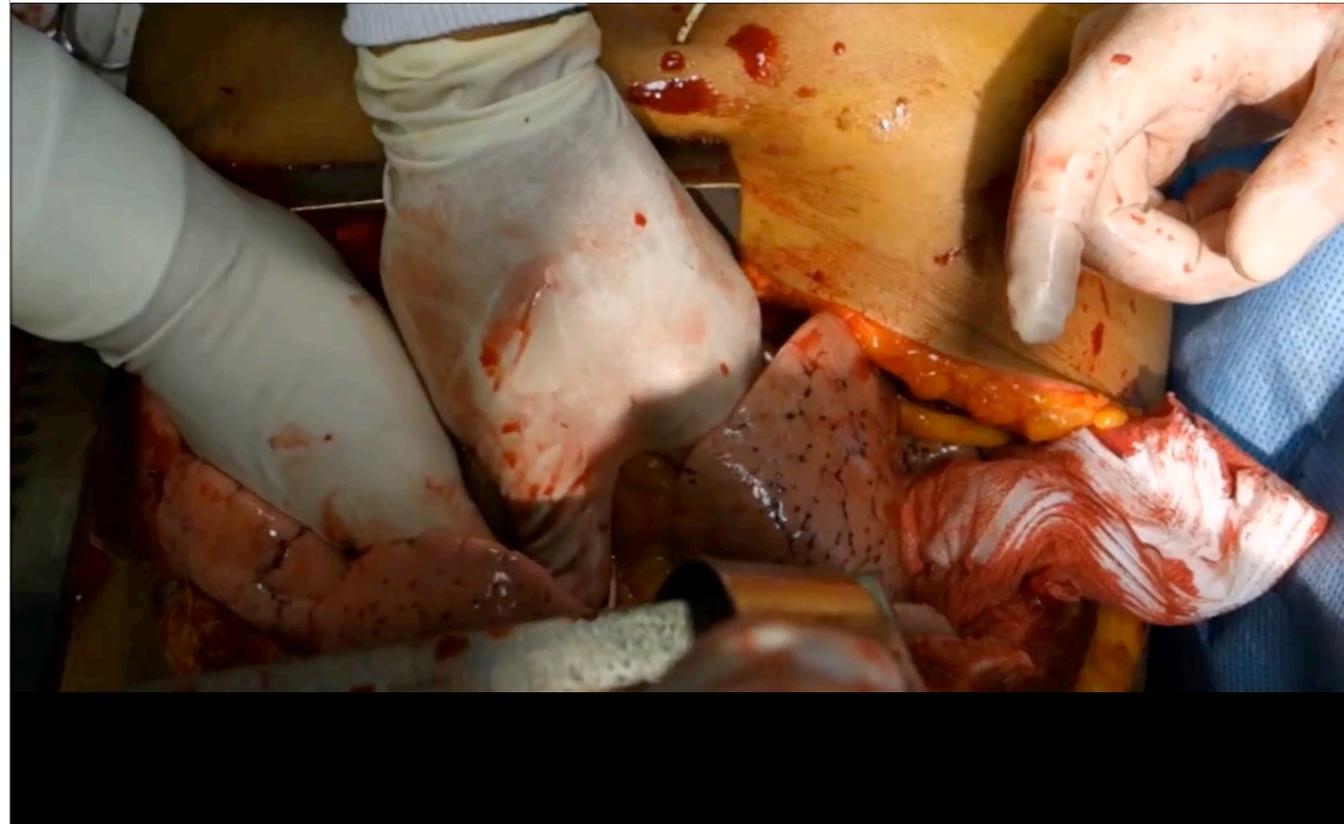
If you are able to get ROSC—> done—> Remember our goals (Restore Cardiac output)

Cardiac Massage

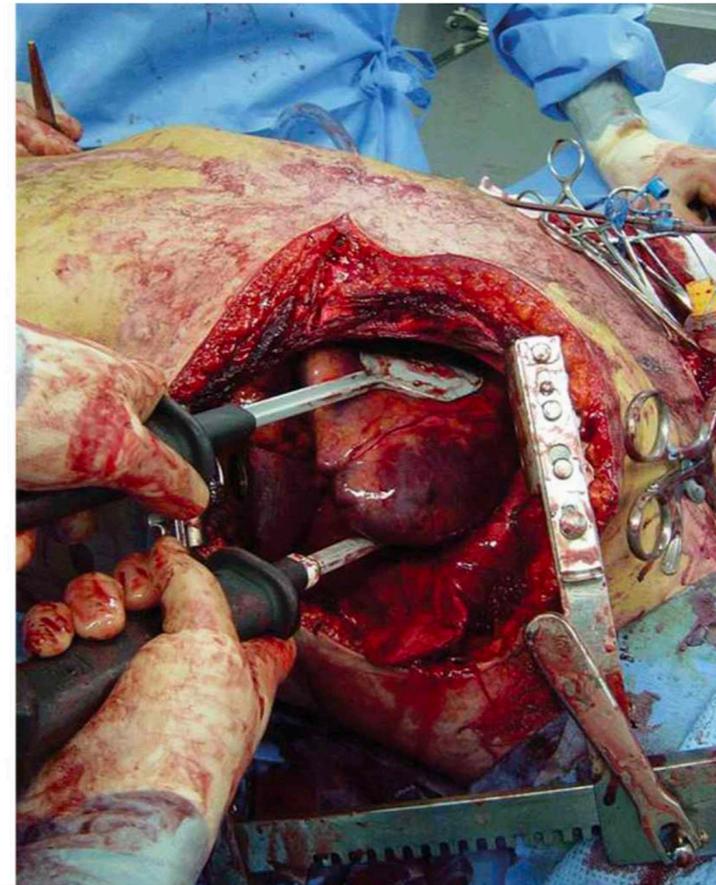
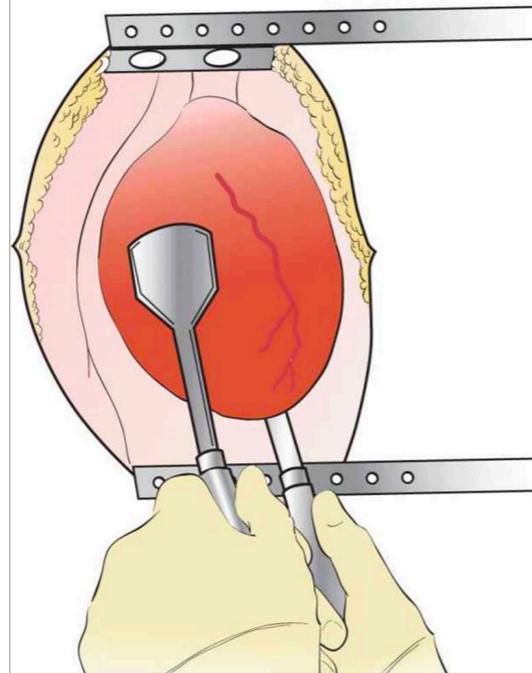
Cardiac Massage



Cardiac Massage



Internal Defibrillation



If pt is in VF

20 Joules- 10—>30 Joules

Can also use intracardiac epic

If these don't work—> CROSS CLAMP aorta

Cross Clamp Aorta



Cross Clamp the Aorta

- DeBakey (Aortic clamp) or curved Kelly Clamp
- -OG tube—> Avoid esophagus—> Clamp the aorta and the esophagus
- - Can get guidance from cardiac massage—> feel pulsation in aorta

Cross Clamp Aorta

- Unable to \uparrow sBP > 70



Cross Clamp Aorta

- Unable to \uparrow sBP $>$ 70
- Maintain Myocardial & Cerebral Perfusion

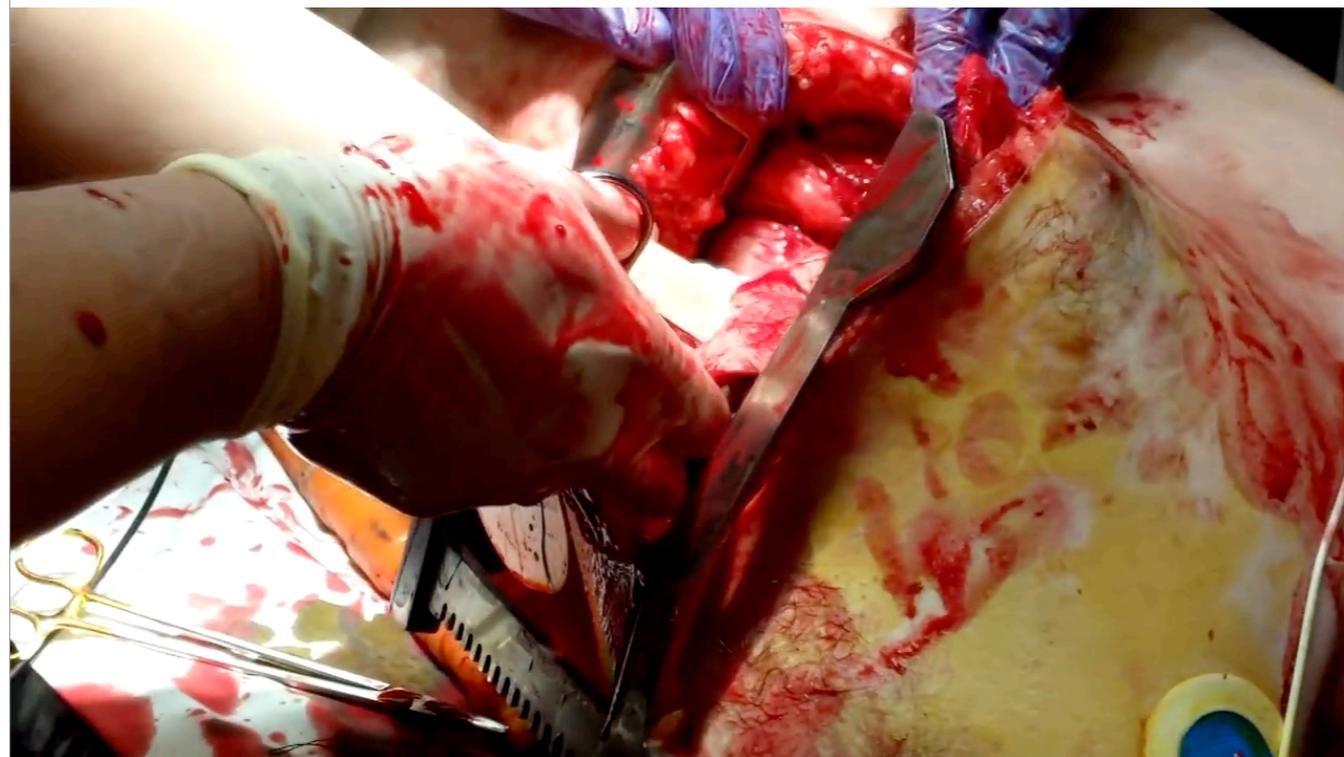


Cross Clamp Aorta

- Unable to \uparrow sBP > 70
- Maintain Myocardial & Cerebral Perfusion
- Helpful for Hemoperitoneum



Cross Clamp Aorta



Clamshell



Massive R HTX—> usually have R sided Chest tube—> if lots of output

Suspect R lung injury

No ROSC- last ditch effort

Reason for handles of spreader to be down towards floor—> allow space for clam shell

Clamshell

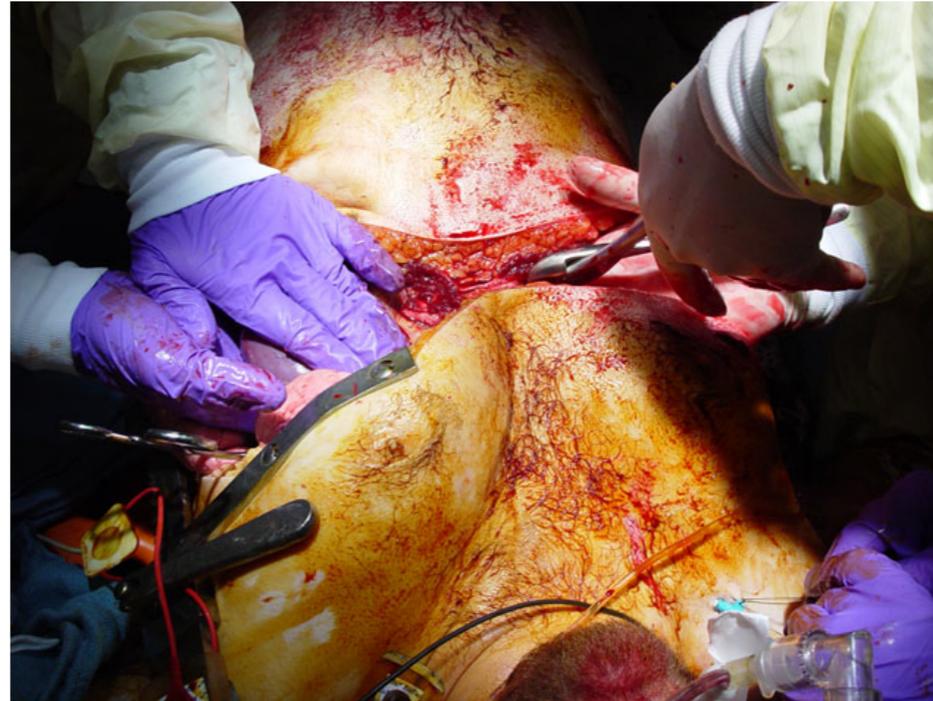


- Massive R HTX
- R Lung Injury
- No ROSC

Clamshell



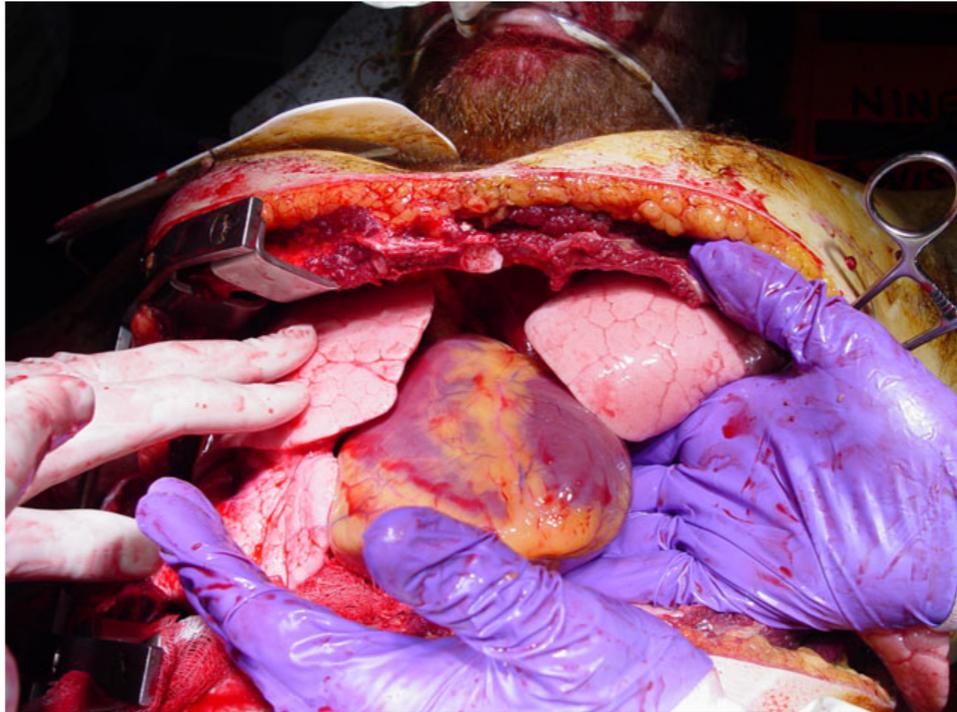
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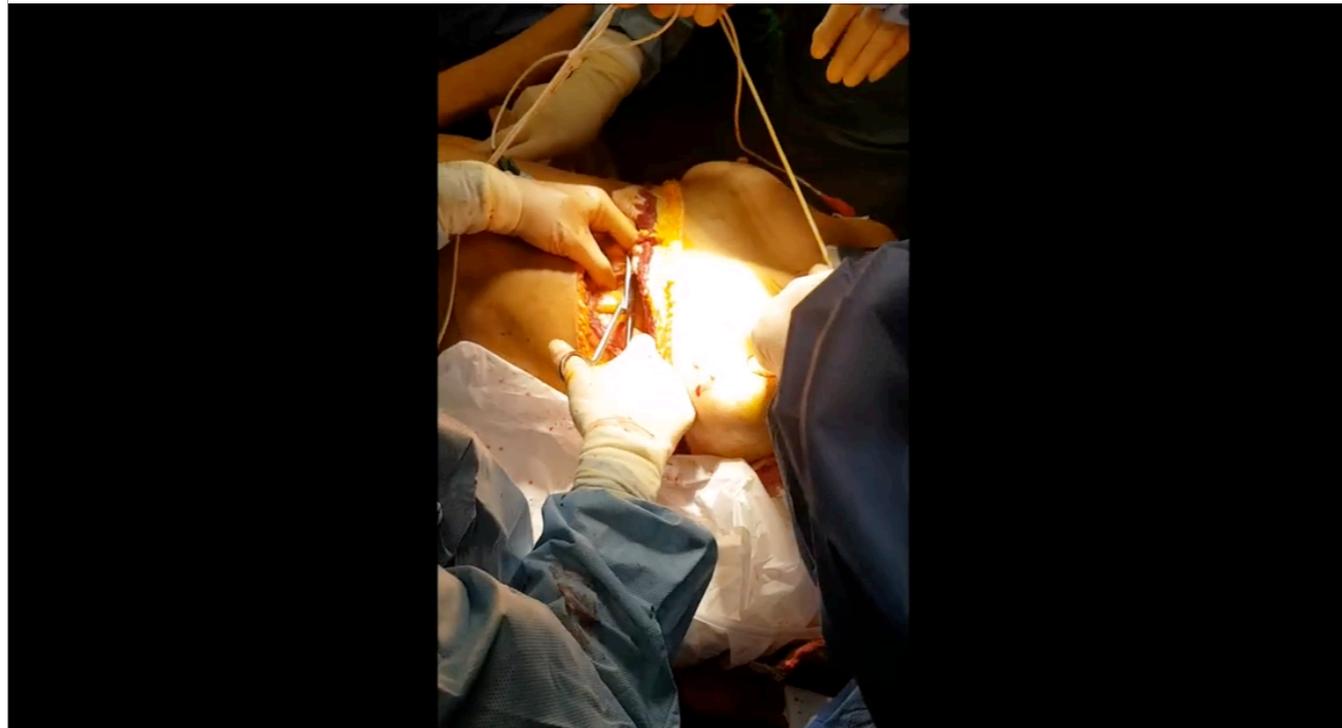
Clamshell



- Massive R HTX
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Clamshell



Thoracotomy

Thoracotomy

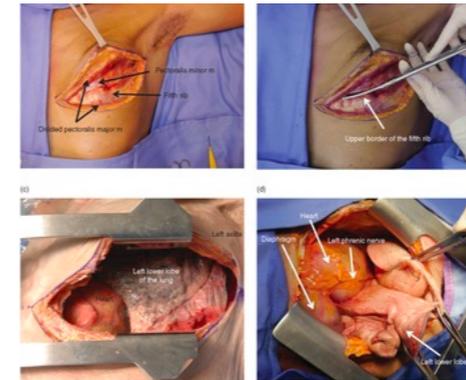
- Predictors

Thoracotomy

- Predictors
- Agressive Incision

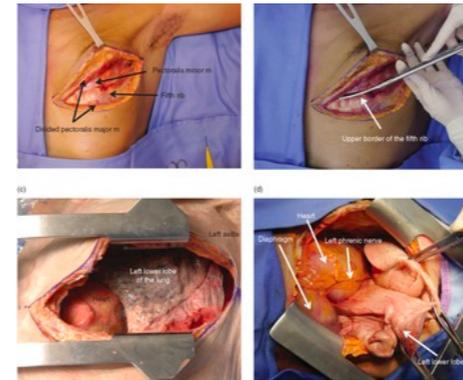
Thoracotomy

- Predictors
- Aggressive Incision



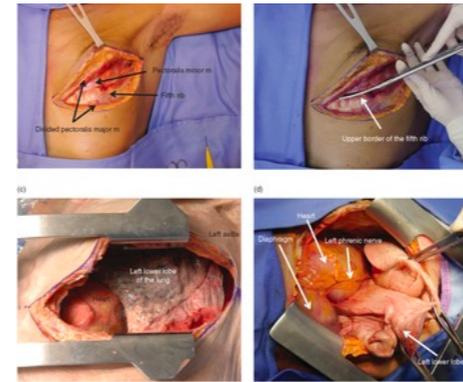
Thoracotomy

- Predictors
- Aggressive Incision
- Pericardotomy



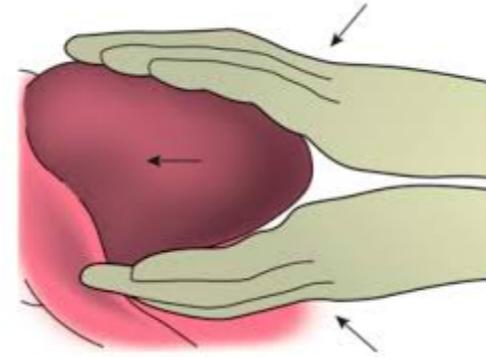
Thoracotomy

- Predictors
- Aggressive Incision
- Pericardotomy
 - Direct Pressure, Foley, Staples



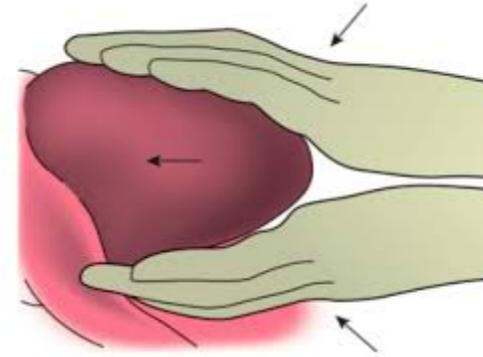
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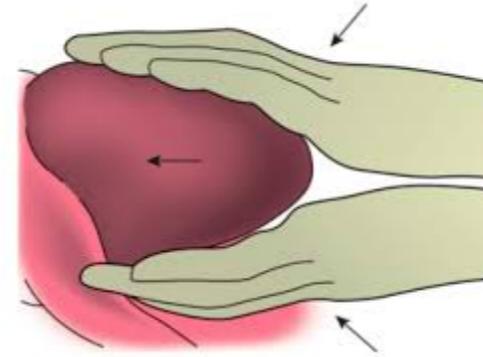
Thoracotomy

- Predictors
- Aggressive Incision
- Pericardotomy
 - Direct Pressure, Foley, Staples
 - 2-Handed Cardiac Massage



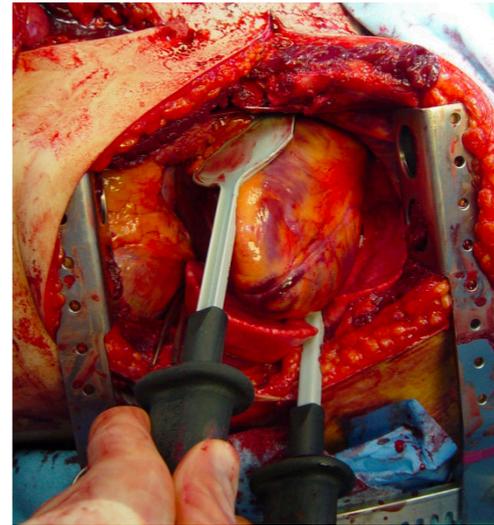
Thoracotomy

- Predictors
- Aggressive Incision
- Pericardotomy
 - Direct Pressure, Foley, Staples
 - 2-Handed Cardiac Massage
 - Internal Defibrillation

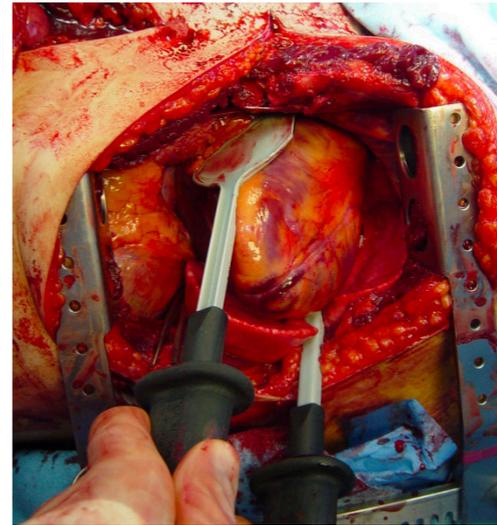


Thoracotomy

- Predictors
- Aggressive Incision
- Pericardotomy
 - Direct Pressure, Foley, Staples
 - 2-Handed Cardiac Massage
- Internal Defibrillation

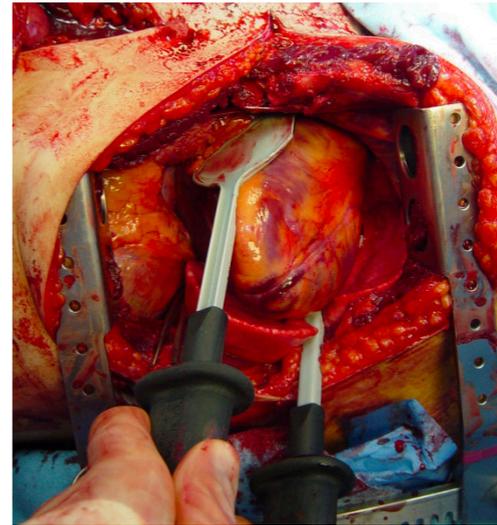


Thoracotomy



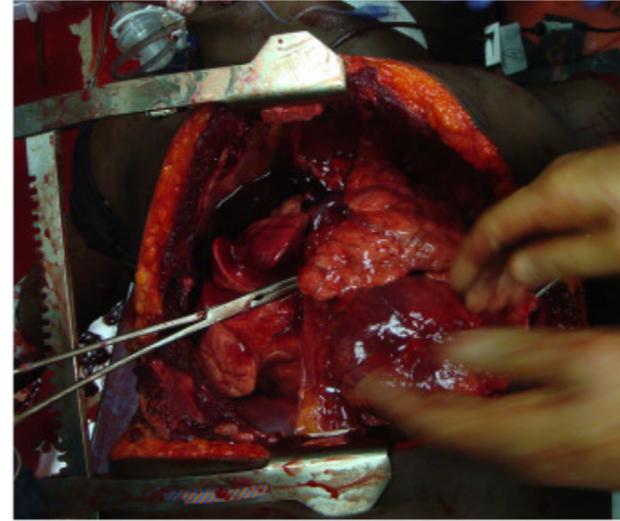
Thoracotomy

- Aorta Cross Clamp
- Clamshell
- Definitive OR Treatment



Thoracotomy

- Aorta Cross Clamp
- Clamshell
- Definitive OR Treatment



Summary

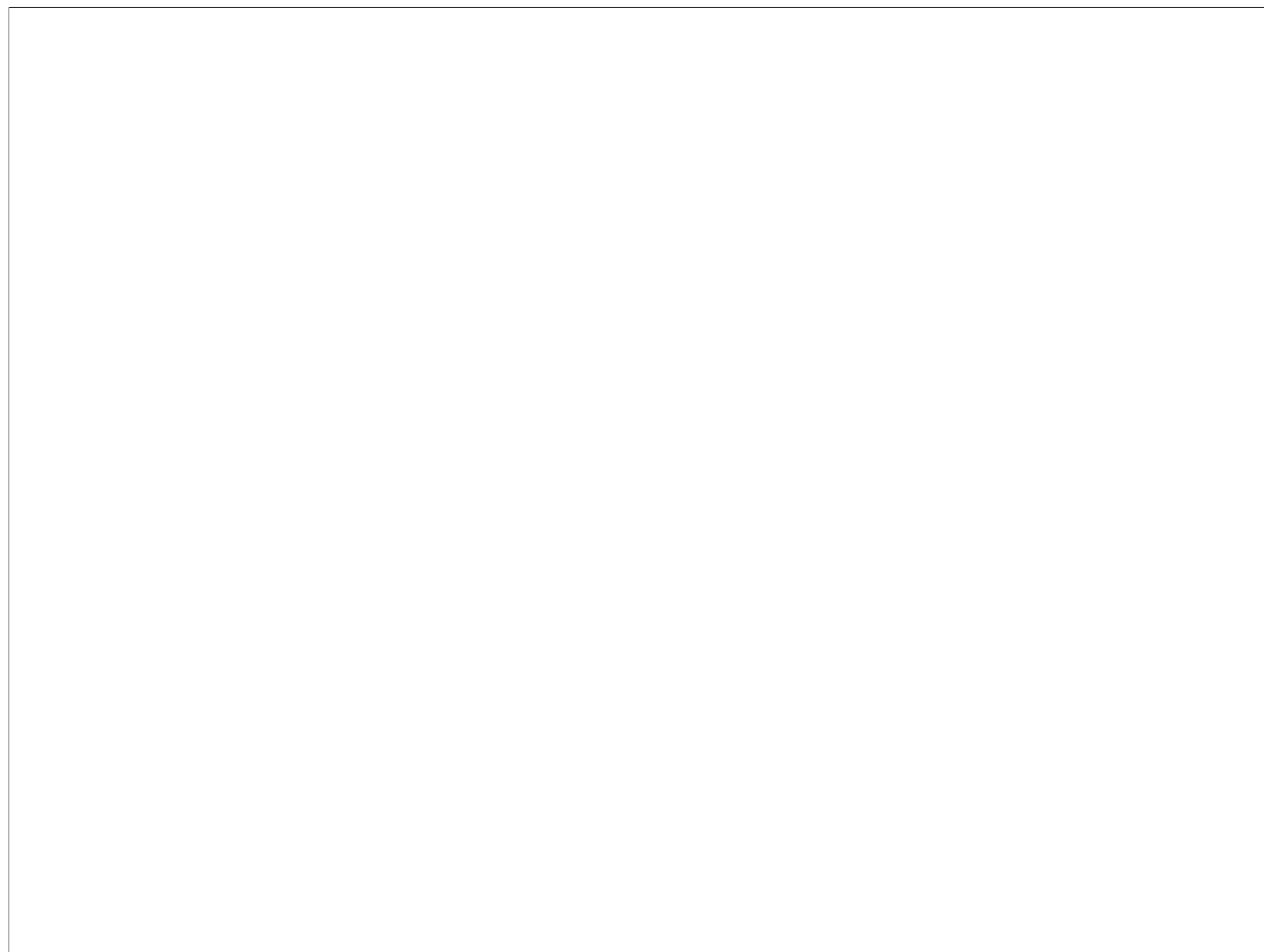
Summary



Summary

Summary



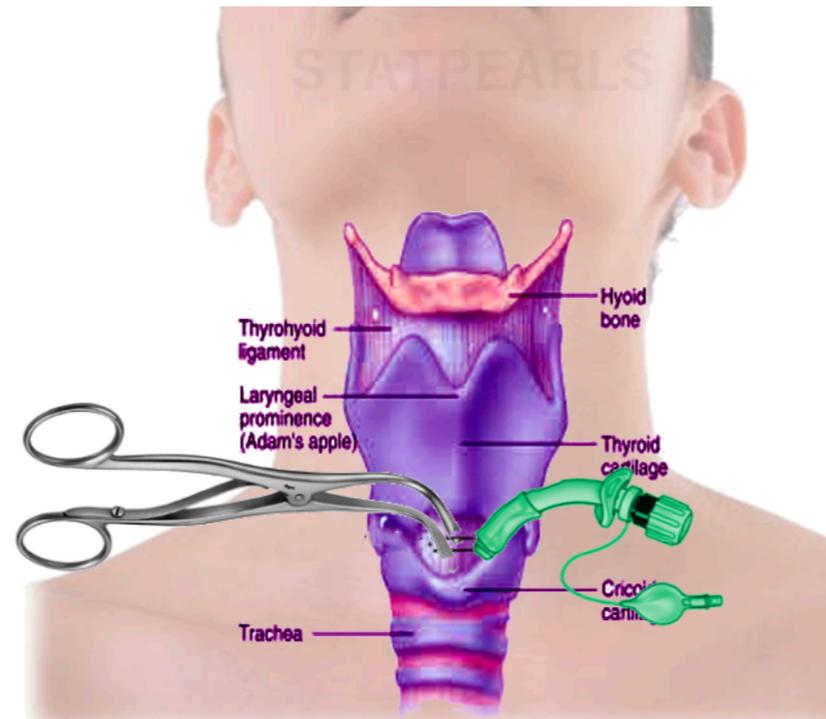


Cric—> Cannot intubate (Needle Cric, Surgical Cric, Bougie-assesited Surgical Cric)

Perimortem C-section—> 24 weeks of pregnancy; Ideal within 4 min; Vertical Incision; Pack with towels; Team ready to take care of baby and continue ACLS during procedure

Thoracotomy—>SW to Heart best outcomes; Large incision; Cardiac Massage;

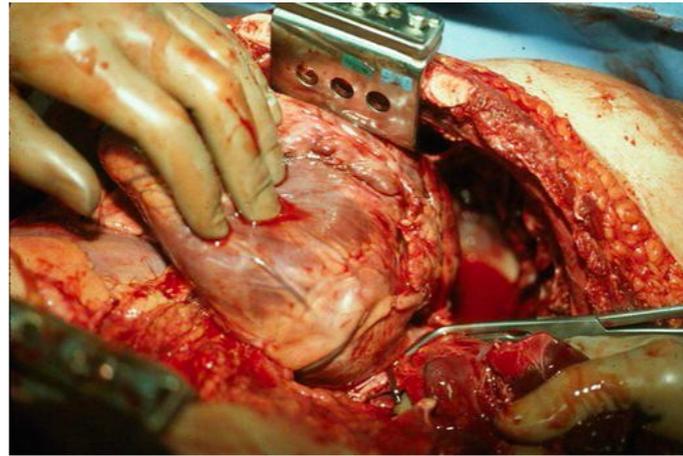
Cricothyrotomy



Perimortem C-Section



Resuscitative Thoracotomy

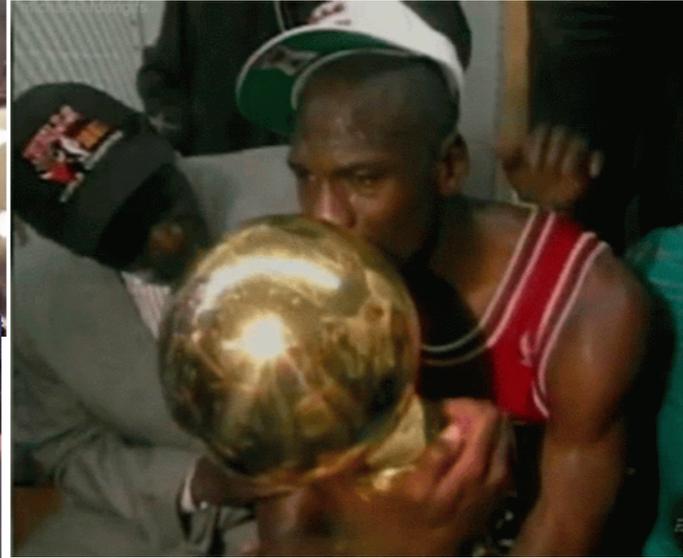


Thank You



No doubt that you will rise to the occasion like Champion that you are!

Thank You



Thank You

