THERE IS NO BELMET

A REVIEW OF TRAUMA IN PREGNANCY

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FACILITY MEDICAL DIRECTOR OB GYN HOSPITALIST PROGRAM RAPIDES REGIONAL MEDICAL CENTER
THERE IS NO BELMET

• NO DISCLOSURES: OBGYN HOSPITALIST FOR TEAM HEALTH AND OB HOSPITALIST GROUP

• TARGET AUDIENCE
  • HEALTH CARE PROFESSIONAL CARING FOR TRAUMA PATIENTS AND WOMEN, ED PHYSICIANS, NURSES, APCS, OB/GYN S, LABOR AND DELIVERY NURSES

• GUIDELINES FOR THE MANAGEMENT OF THE PREGNANT TRAUMA PATIENT, JUNE JOGC NO325, ACOG COMMITTEE OPINION 656,

• OVERVIEW
  • INTRODUCTION AND STATISTICS
  • ASSESSMENT OF PREGNANT TRAUMA PATIENT
    • RADIOLICAL EXPOSURE
    • LAB EVALUATION
  • MANAGEMENT AND ASSOCIATED COMPLICATIONS
WHAT IS A BEL-MET

• BELLY + HELMET = BELMET
  • A PROTECTIVE DEVICE A PREGNANT WOMAN COULD WHERE TO PREVENT TRAUMA IN PREGNANCY
  • WHO WOULD BE A GOOD CANDIDATE
  • DOESN'T EXIST
  • WOULDN'T WORK
  • WOULD PROBABLY BE REPEALED LIKE MOST MANDATORY HELMET LAWS
  • COUNSEL PREGNANT PATIENTS TO AVOID DANGEROUS ACTIVITIES
DANGEROUS ACTIVITIES IN PREGNANCY

This is Lindsey Manning, she's been sky diving for 8 years....

http://nooga.com/160404/profile-of-a-pregnant-skydiver/
DANGEROUS ACTIVITIES IN PREGNANCY

- MOTOR CYCLE RIDING
- BICYCLE RIDING
- COMMON SENSE?
- EXERCISE AND SEX ARE SAFE
DON’T ASSUME YOUR PATIENT KNOWS

IS THIS SAFE IN PREGNANCY?
- DANGEROUS ACTIVITY NON PREGNANT IS MORE DANGEROUS PREGNANT

PELVIS PROTECTS UNTIL 13 WEEKS...BUT DOESN’T ACTUALLY MATTER IF YOU BREAK YOUR PELVIS, BUT EVEN IF YOU DON’T
- INCREASED RISK DUE TO MEDICATION RADIATION AND MEDICATION EXPOSURE

CASE PRESENTATION
31 Y/O G1 AT 13 WGA RIDING HOME FROM JAZZFEST
- CAR VS SCOOTER
- GRADE IV LIVER LACERATION
- 11 BROKEN RIBS
- SCAPULAR FRACTURE
IS TRAUMA COMMON IN PREGNANCY

• LEADING CAUSE OF NON OBSTETRIC MATERNAL DEATH
• PHYSICAL TRAUMA AFFECTS 1 IN 12 PREGNANCIES
• MOM FIRST BABY SECOND
  • STABILIZE MOTHER FIRST...ALWAYS
• WHO’S PREGNANT?
  • ASSUME PREGNANT UNTIL PROVEN OTHERWISE
  • ACCORDING TO BOCHICCHIO STUDY 3% OF WOMEN ADMITTED TO TRAUMA SERVICE WHERE PREGNANT AND 11% WERE INCIDENTAL
PREGNANT TRAUMA AT RAPIDES

- SEPTEMBER 1, 2015 THRU AUGUST 31, 2016
- 3284 RECORDS, 1002 FEMALE, 381 REPRODUCTIVE AGE WOMEN (15-45)
- 72 MATCH PREGNANCY ACTIVATION CRITERIA
- 19% OF FEMALE TRAUMA ACTIVATIONS
- ONLY 1 KNOWN FETAL DEMISE DUE TO MVC (OUT OF 36), MOM HAD FACIAL LACERATION, LAFORT FRACTURE, DELIVERED 28 WGA, SVD

level of trauma activations for women

- level 1
- level 2
- level 3
PREGNANT TRAUMA AT RAPIDES

Pregnant Trauma Activations

- Sting/Bites - 1
- Struck by Object - 3
- Assaults - 12
- Falls - 20
- Motor Vehicle Collision - 36
MOST COMMON CAUSE OF TRAUMA

- MOST COMMON CAUSE OF TRAUMATIC INJURY – MOTOR VEHICLE COLLISION
  - 70% OF MATERNAL DEATH - REDUCED FROM 33-5% WITH??
  - PROPER SEAT BELT PLACEMENT
    - BELOW THE ABDOMEN, NOT OVER UTERUS
    - BETWEEN BREASTS
    - COMFORTABLE NOT TIGHT
- AIRBAGS
  - PROBABLY BETTER THAN NOT, ASSOCIATED WITH UTERINE RUPTURE, ABRUPTION, DEATH BUT LIKELY DUE TO SEVERITY OF MCV NOT AIRBAG
ASSESSMENT OF THE PREGNANT TRAUMA

• PRIMARY SURVEY – NOT MUCH DIFFERENT FROM NON PREGNANT ABCS
  • AIRWAY
    • GREATER RISK FOR AIRWAY COMPROMISE
    • WEIGHT GAIN, RESPIRATORY TRACT MUCOUSAL EDEMA, DECREASED FUNCTIONAL RESIDUAL CAPACITY, REDUCED COMPLIANCE, INCREASED O2 REQUIREMENTS
    • PLACE NG TUBE IF DECREASED CONSCIOUSNESS, INCREASED RISK ASPIRATION OF GASTRIC CONTENTS
  • BREATHING
    • MAINTAIN O2 SAT OVER 95%
    • IF THORACOSTOMY TUBE NECESSARY PLACE 1-2 INTERCOSTAL SPACES HIGHER THAN USUAL DUE TO DISPLACEMENT OF DIAPHRAGM
  • CIRCULATION
    • 2 LARGE BORE IV
    • AVOID VASOPRESSORS
    • UTERINE COMPRESS OF IVC CAN CAUSE UP TO 30% REDUCTION IN CARDIAC OUTPUT, PLACE PT IN LEFT LATERAL POSITION OR MANUALLY DISPLACE THE UTERUS
WHERE DOES THE PATIENT GO?

• IF PATIENT IS IN TRAUMATIC INJURY SHE SHOULD GO WHERE TRAUMA IS BEST ASSESSED

• **THE MAIN EMERGENCY DEPARTMENT**

• ONCE STABILIZED CONSIDERATION CAN BE MADE TO TRANSFER TO LABOR DELIVERY BUT A FETAL MONITOR AND A LABOR AND DELIVERY NURSE CAN BE BROUGHT TO THE ED

• IF PATIENT IS LESS THAN 23 WGA, SHE CAN STAY IN THE ED

• 23 WEEKS OR GREATER TRANSFER TO L AND D ONCE STABILIZED FOR PROLONGED MONITORING
ASSESSMENT OF THE PREGNANT TRAUMA

• PHYSICAL EXAM – JUST LIKE ANY OTHER TRAUMA PATIENT
  • EXPOSE ALL BODY PARTS
  • CONTOUR OF ABDOMEN FOR ABNORMAL DISTENTION
  • DOCUMENT FUNDAL HEIGHT AND UTERINE TENDERNESS
  • DOCUMENTATION OF ENTRY AND EXIT WOUNDS FOR PENETRATING TRAUMA
  • VITAL SIGNS – REMEMBER MATERNAL HEART RATE INCREASES UP TO 15% IN PREGNANT PATIENT (UP TO 120S IS NORMAL)

• RADIOLOGICAL STUDIES
  • DON’T DELAY, REMEMBER RULE 1. DO WHAT IS NECESSARY FOR MOM
RADIOLOGICAL EXPOSURE

- IONIZING RADIATION HAS HIGHEST TERATOGENIC POTENTIAL DURING ORGANOGENESIS (5-10 WEEKS)—ALL OR NOTHING
- FETAL EXPOSURE LESS THAN 50 MGY UNLIKELY TO HAVE ANY EFFECT
- DOES IT CAUSE CANCER?? NOT LIKELY
  - 10-20 MGY EXPOSURE MAY INCREASE RISK OF LEUKEMIA BY 1.5-2 OVER BACKGROUND RATE OF 1/3000

### Table 3. Fetal Radiation Doses Associated With Common Radiologic Examinations

<table>
<thead>
<tr>
<th>Type of Examination</th>
<th>Fetal Dose* (mGy)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Very low-dose examinations (&lt;0.1 mGy)</strong></td>
<td></td>
</tr>
<tr>
<td>Cervical spine radiography (anteroposterior and lateral views)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Radiography of any extremity</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mammography (two views)</td>
<td>0.001–0.01</td>
</tr>
<tr>
<td>Chest radiography (two views)</td>
<td>0.0005–0.01</td>
</tr>
<tr>
<td><strong>Low- to moderate-dose examinations (0.1–10 mGy)</strong></td>
<td></td>
</tr>
<tr>
<td>Radiography</td>
<td></td>
</tr>
<tr>
<td>Abdominal radiography</td>
<td>0.1–3.0</td>
</tr>
<tr>
<td>Lumbar spine radiography</td>
<td>1.0–10</td>
</tr>
<tr>
<td>Intravenous pyelography</td>
<td>5–10</td>
</tr>
<tr>
<td>Double-contrast barium enema</td>
<td>1.0–20</td>
</tr>
<tr>
<td>CT</td>
<td></td>
</tr>
<tr>
<td>Head or neck CT</td>
<td>1.0–10</td>
</tr>
<tr>
<td>Chest CT or CT pulmonary angiography</td>
<td>0.01–0.66</td>
</tr>
<tr>
<td>Limited CT pelvimetry (single axial section through the femoral heads)</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Nuclear medicine</td>
<td></td>
</tr>
<tr>
<td>Low-dose perfusion scintigraphy</td>
<td>0.1–0.5</td>
</tr>
<tr>
<td>Technetium-99m bone scintigraphy</td>
<td>4–5</td>
</tr>
<tr>
<td>Pulmonary digital subtraction angiography</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Higher-dose examinations (10–50 mGy)</strong></td>
<td></td>
</tr>
<tr>
<td>Abdominal CT</td>
<td>1.3–35</td>
</tr>
<tr>
<td>Pelvic CT</td>
<td>10–50</td>
</tr>
<tr>
<td>18F PET/CT whole-body scintigraphy</td>
<td>10–50</td>
</tr>
</tbody>
</table>

*Fetal exposure varies with gestational age, maternal body habitus, and exact acquisition parameters.

Note: Annual average background radiation = 1.1–2.5 mGy; 18F = 2-[18F]fluorodeoxyglucose.
# Radiation Exposure

**Table 2. Effects of Gestational Age and Radiation Dose on Radiation-Induced Teratogenesis**

<table>
<thead>
<tr>
<th>Gestational Period</th>
<th>Effects</th>
<th>Estimated Threshold Dose*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before implantation (0–2 weeks after conception)</td>
<td>Death of embryo or no consequence (all or none)</td>
<td>50–100 mGy</td>
</tr>
<tr>
<td>Organogenesis (2–8 weeks after conception)</td>
<td>Congenital anomalies (skeleton, eyes, genitals) Growth restriction</td>
<td>200 mGy 200–250 mGy</td>
</tr>
<tr>
<td><strong>Fetal period</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8–15 weeks</td>
<td>Severe intellectual disability (high risk)* Intellectual deficit Microcephaly</td>
<td>60–310 mGy 25 10-point loss per 1,000 mGy 200 mGy</td>
</tr>
<tr>
<td>16–25 weeks</td>
<td>Severe intellectual disability (low risk)</td>
<td>250–280 mGy*</td>
</tr>
</tbody>
</table>

*Data based on results of animal studies, epidemiologic studies of survivors of the atomic bombings in Japan, and studies of groups exposed to radiation for medical reasons (eg, radiation therapy for carcinoma of the uterus).

*Because this is a period of rapid neuronal development and migration.

RADIOLOGICAL EXPOSURE CONTINUED

- Radiographic studies indicated for maternal evaluation should not be deferred or delayed due to concerns regarding fetal exposure – this includes abdominal CT.

- Use of gadolinium-based contrast agents can be considered when maternal benefit outweighs potential fetal risks, also safe for breast feeding.

- IV contrast can be given if necessary and needed.
  - Animal studies show no harm.
  - Theoretical risk of free iodide on fetal thyroid have also not been proven.
  - Safe to breast feed.
LAB EVALUATION

- Pregnancy levels are different then normal, before acting solely on a lab discuss with your friendly OB/GYN hospitalist.
- WBC - elevated in normal pregnancy (up to 20),
- Fibrinogen – often more than 4g
  - Between 2.5-3.5 might be hypofibrinogenemia, less than 2 may indicate DIC
- D-dimer, elevated in pregnancy, not indicative of PE
- Always get coagulation panel and type in screen on any pregnant trauma patient.
RH ALLOIMMUNIZATION

• Maternal fetal hemorrhage occurs in 10-30% of pregnant trauma patients.

• RH antigen well developed by 6 WGA, as little as .001 ml of maternal blood can cause sensitization.

• Must be given to all RH negative pregnant trauma patients, within 72 hrs of injury.

• Provides protection against sensitization for up to 30 ml of fetal blood in maternal circulation.

• Use KB test to determine if more than one 300 microgram Rhogam is necessary.

• KB test for RH positive mom? No clear opinion but if MFH present PT will probably have contractions so they will be monitored anyway…I don’t order on RH positive mom.
ADDITIONAL EVALUATION

- FAST – USEFUL IN DETECTION OF INTRAPERITONEAL FLUID
  - SENSITIVITY 83% IN DETECTION IN PREGNANT PATIENT WHICH IS THE SAME AS NON PREGNANT
  - EVEN THE ED DR CAN USE IT TO DO A BRIEF U/S TO EVALUATE THE FETUS… STICK TO WHAT YOU KNOW
    - IS IT IN THE UTERUS?
    - HOW MANY ARE THERE?
    - IS THERE CARDIAC ACTIVITY?
    - DO NOT TRY TO EVALUATE FOR ABRUPTION…MORE TO FOLLOW

- PERITONEAL LAVAGE AND LAPAROTOMY
  - LOW COST EASILY INTERPRETABLE TEST (96-100% SENSITIVE) FOR DETECTION OF TRAUMATIC INTRA-ABDOMINAL INJURY
  - DISADVANTAGE – NONSPECIFIC AND INJURIES THAT MAY BE MANAGED CONSERVATIVELY IF FOUND ON CT MIGHT REQUIRE OPERATIVE INTERVENTION BASED ON DPL
  - OPEN TECHNIQUE PREFERRED TO BLIND NEEDLE IN PREGNANT PATIENT
Fetal Assessment - Objectives

- Identification of impending hypoxemic fetal injury or death as a result of uteroplacental compromise or placental abruption
- Detection of trauma related complications
  - Abortion
  - Preterm delivery
  - Spontaneous rupture of membranes
- Evaluation of degree of maternal-fetal hemorrhage and resultant fetal anemia
- Delineation of fetal injuries
- Identification of compensated maternal hypovolemia first manifested by decreased placental perfusion
HOW FAR ALONG IS SHE?

- Gestational age is vital to interpretation of tests for fetal viability and well-being.

- How to determine:
  - Patient has known EDC
  - If known LMP can use Naegle’s rule: Add 1 year – 3 months + 1 week
  - Fundal height
    - 20 WGA – at umbilicus
    - Correlates in cm to gestational age when measured from pubic symphysis
  - Get an ultrasound!!!!

- B-HCG, not reliable for dating due to normal range but rule of 10’s helpful
  - 100 at missed period
  - 100,000 at 10 WGA
  - 10,000 at delivery

- For all of you ED docs…management of ectopic is a different lecture…But just most important 1500-2000 is discretionary zone where you should see something in the uterus.
WHO TO MONITOR

• CONTINUOUS FETAL HEART RATE MONITORING FOR A MINIMUM OF 4 HOURS SHOULD BE DONE ON ANY VIABLE FETUS

• VIABILITY IS CONSIDERED ANY FETUS 23 WEEKS OR GREATER

• ABNORMAL TRACING FOLLOWING TRAUMA IS NOT RELIABLY PREDICTIVE OF ADVERSE OUTCOME (SENSITIVITY 62%, SPECIFICITY 49%) BUT NORMAL TRACING AND EXAM HAS NEGATIVE PREDICTIVE VALUE OF 100% IN EXCLUDING ADVERSE OUTCOME

• ACCORDING TO SEVERAL STUDIES THE SENSITIVITY OF PREDICTING ABRUPTION BY THE FREQUENCY OF UTERINE ACTIVITY IN THE FIRST FOUR HOURS FOLLOWING TRAUMA WAS 100%
MONITOR FOR 24 HOURS IF:

• HAVING MORE THAN 1 CONTRACTION EVERY 10 MINUTES (OR 4-6 PER HOUR)
• UTERINE TENDERNESS PRESENT
• SIGNIFICANT ABDOMINAL PAIN
• VAGINAL BLEEDING
• RUPTURED MEMBRANES
• ABNORMAL FETAL HEART RATE PATTERN
• HIGH RISK MECHANISM FOR INJURY (MOTORCYCLE, PEDESTRIAN VS, HIGH SPEED CRASH)
• SERUM FIBRINOGEN LESS THAN 200
ABRUPTION – THE BIG DEAL

• PREMATURE SEPARATION OF NORMALLY IMPLANTED PLACENTA FROM THE UTERUS
• FETAL DEATH RESULTS IN MOST CASES WHEN GREATER THAN 50% SEPARATION
• CAN BE IDIOPATHIC BUT COMMONLY ASSOCIATED WITH TRAUMA (5-50% DEPENDING ON SEVERITY OF TRAUMA)
• IF DETECTED PRIOR TO FETAL DEATH GOOD OUTCOME POSSIBLE (75% SURVIVAL)
• ONCE ABSENCE OF CARDIAC ACTIVITY CONFIRMED IT IS TOO LATE
• MOST COMMONLY RESULTS FROM BLUNT TRAUMA OR DECELERATION FORCES
ULTRASOUND CRITERIA FOR ABRUPTION

- U/S still only 50% sensitive, primarily a clinical diagnosis confirmed with pathology
- Preplacental collection under chorionic plate
- Jello like movement of chorionic plate with fetal activity
- Retroplacental collection
- Marginal hematoma
- Subchorionic hematoma
- Increased heterogeneous placental thickening
- Intraamniotic hematoma

From www.glowm.com
DIAGNOSIS OF ABRUPTION

• PERSISTENT ABDOMINAL PAIN
• OFTEN SEE HIGH FREQUENCY LOW AMPLITUDE CONTRACTIONS
• TETANIC CONTRACTIONS COMMON
• BACK PAIN COMMON WHEN PLACENTA POSTERIOR
• VAGINAL BLEEDING
• FETAL BRADYCARDIA
FETAL HEART RATE TRACING-ABRUPTION
NORMAL FHR TRACING
FETAL HEART RATE TRACING-ABRUPTION

Sinusoidal FHR – really bad

Absent variability, late decelerations
CASE PRESENTATION

- 36 Y/O BACK SEAT PASSENGER MOTORCYCLE VS BUS, DRIVER DEAD
  - UNCONSCIOUS: GCS 8/15, BP 63/37, HR 160; RR 32, ABDOMEN SOFT WITHOUT GUARDING
- FAST U/S – EFFUSION IN HEPATORENAL (MORISON’S) SPACE, SPLENORENAL SPACE, RETROUTERINE POUCH OF DOUGLAS
- ONCE STABILIZED WITH 2 LT NS, SENT TO CT

“IN THE PERITONEUM AND JUST BEHIND THE ABDOMINAL WALL MUSCLES THE PRESENCE OF A HETEROGENEOUS FLUID DENSITY FORMATION CONTAINING TISSUE AND BONE, GROSSLY OVOID MEASURING ABOUT 12CM/6CM ASSOCIATED WITH DENSE AND FLUID INTRAPERITONEAL EFFUSION, ESTIMATED TO 2 LITERS. THESE FINDINGS ARE CORRESPONDING TO AN INTRAPERITONEAL EMBRYO ASSOCIATED WITH HEMORRHAGIC EFFUSION (FIGURE 1)”
WHAT COULD HAVE BEEN DONE DIFFERENTLY??

- Patient immediately transferred to OR for EXLAP, which confirmed fundal uterine rupture and dead 12 week fetus with placenta in abdominal cavity, no other site of bleeding noted
- Senior OB Gyn resident then called to assist
- Conservative treatment attempted
- Patient died 2 days later due to DIC from traumatic blood loss

DISCUSSION

- “As we did not previously know that the patient was pregnant we performed a classic FAST echo which showed the hemoperitoneum but did not help to detect the fetus as our emergency physicians are not trained to obstetrical ultrasound.”
UTERINE RUPTURE

• LESS THAN 1% OF PREGNANCY RELATED TRAUMA
• RARE COMPLICATION
• 75% OF IN FUNDAL REGION
• CAUSE OF FETAL DEATH AFTER MVA 17.5%
• MORE COMMON IN 2ND HALF OF PREGNANCY OR WITH HX OF UTERINE SCAR
• REQUIRES EMERGENT SURGICAL TREATMENT WITH REPAIR OR C-HYST!!!!
PRETERM LABOR

LABOR PRIOR TO 37 WGA

• WHAT IS LABOR
  • PAINFUL CONTRACTIONS WITH CERVICAL DILATION…IF CERVIX DOESN’T DILATE, IT’S NOT LABOR
• TRAUMA, EVEN MINOR, DOUBLES RISK OF PTL
• BIGGEST RISK FACTORS FOR PTL – PREVIOUS HX OF PTL
• CAN EVALUATE WITH FFN AND CERVICAL LENGTH BUT IF ABRUPTION PRESENT DOESN’T MATTER, STILL MONITOR

MANAGEMENT

• ANTENATAL STEROIDS
• MAGNESIUM SULFATE
• EVALUATION FOR UTI OR OTHER ETIOLOGY
• TRANSFER TO FACILITY WITH LEVEL III NICU
• NOT A TOPIC FOR THIS PRESENTATION
LETS TALK SPECIFIC INJURIES

• PENETRATING TRAUMA – GUNSHOT WOUNDS AND STABBING
• DOMESTIC ABUSE
• FALLS
• ELECTRICAL TRAUMA
INTIMATE PARTNER VIOLENCE

• AKA DOMESTIC ABUSE, SPOUSAL ABUSE, WIFE BEATING

• PATTERN OF ASSAULTIVE AND COERCIVE BEHAVIOR THAT MAY INCLUDE PHYSICAL INJURY, PHYSIOLOGICAL ABUSE, SEXUAL ASSAULT, REPRODUCTIVE COERCION

• 324,000 PREGNANT WOMEN ARE ABUSED ANNUALLY

• HIGHER INCIDENCE IN 3RD TRIMESTER, 67% OF PHYSICAL TRAUMA RELATED TO ABDOMEN

• SCREENING QUESTIONS: HAS YOUR CURRENT PARTNER EVER THREATENED YOU OR MADE YOU FEEL AFRAID

• ASK QUESTIONS WITH PARTNER ABSENT, REMEMBER RED FLAGS
  • PARTNER ANSWERS FOR PATIENT, WON’T LEAVE PATIENTS SIDE, PREVIOUS INJURIES OR ADMISSIONS
PENETRATING TRAUMA

- MOST COMMONLY DUE TO GSW AND STABBING
  - GSW WORSE THAN STABBING...IN GENERAL
- MATERNAL BOWEL LESS LIKELY TO BE INVOLVED WITH PENETRATING INJURIES AFTER 2ND TRIMESTER DUE TO PROTECTION OF BOWEL BY UTERUS
  - VISCERAL INJURY OCCURS 15-40% COMPARED WITH 80-90% IN NON-PREGNANT WOMEN
  - FETUS INJURED 60-70%
  - FETUS MORE LIKELY TO BE INJURED AND DIE THAN MOTHER
- TETANUS VACCINATION SAFE IN PREGNANCY
GUN SHOT WOUNDS IN PREGNANCY

MOST PENETRATING TRAUMA IS GSW

• Transient shock waves and cavitations in displacement of kinetic energy to body tissue causing more damage
• 70% of ABD GSW results in fetal injury, 40-65% result in fetal death
• If stable can assess same as nonpregnant, contrast CT, ultrasound

IF YOU WOULD EXLAP NON PREGNANT
EXLAP PREGNANT

• Same indications apply - +lavage, free air under diaphragm, progressive abdominal distention with declining hematocrit, abdominal wall disruption or perforation
• Do you do a C/S with exlap...depends on gestational age, degree of fetal uterine injury, degree of maternal injury
ELECTRICAL INJURY

- 5th leading cause of fatal occupational injury in US
- More than my favorite ICD 9 and now ICD 10 code – V97.33XD
- Still very uncommon in pregnancy
- Severity dependent on voltage and pathway through the body
  - Hand to foot through uterus and amniotic fluid could be worse, amniotic fluid is an excellent conductor
- Very poor outcomes with limited data but one series has aprox 75% fetal mortality
- Should be monitored for at least 24 hours if injury resulted in LOC, abnormal maternal EKG, or known maternal cardiovascular illness
- If low voltage fetal effects are unlikely
PERIMORTEM CESAREAN SECTION

• SHOULD BE DONE NO LATER THAN 4 MINUTES FOLLOWING MATERNAL CARDIAC ARREST

• RATIONAL – MATERNAL NEUROLOGICAL INJURY OCCURS 6 MINUTES AFTER CESSION OF CEREBRAL BLOOD FLOW, SO CARDIAC RETURN SHOULD BE BY 5 MINUTES

• RECOMMENDED FOR ALL VIALBLE PREGNANCIES GREATER THAN 23 WGA OR FUNDAL HT GREATER THAN 2 FINGERBREADTHS ABOVE THE UMBILICUS
  • UTERUS IS LARGE ENOUGH TO CAUSE AORTOCAVAL COMPRESSION, EMPTYING IMPROVES MATERNAL CARDIAC OUTPUT, AND INFANT HAS CHANCE FOR SURVIVAL

• TRAUMA PATIENTS WITH CARDIAC ARREST ARE LESS LIKELY TO RESPOND TO RESUSCITATION BUT IN THIS SITUATION IT IS PRIMARILY DONE FOR FETAL SALVAGE

• IF THERE ARE NO FETAL HEART TONES AT INITIAL PRESENTATION, C-SECTION IS NOT GOING TO CHANGE FETAL OUTCOME
THANK YOU – HOPPY ENDING