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Poster Abstracts
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AMERICAN COLLEGE OF OSTEOPATHIC
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AWARD CATEGORY ABSTRACTS
**Category:** Award

**Title:**
Effect of Amniocentesis Prior to Cerclage Placement on Antenatal Complications and Gestational Age at Delivery

**Presenter:**
Jason Wheatley, DO

**Objective:**
Our objective is to determine if having an amniocentesis prior to cerclage affects antenatal course or gestational age at delivery.

**Methodology:**
Retrospective cohort study reviewing all cerclages performed from January 2007 to April 2017 in three community hospitals was conducted using detailed chart abstraction by a Maternal Fetal Medicine (MFM) specialist. Data abstracted included demographic information, cerclage indication, gestational age (GA) at delivery, antenatal complications, and fetal outcomes. All history indicated cerclages were excluded as well as any pregnancy with known fetal anomalies or pregnancies where a medically indicated delivery occurred prior to 34 weeks GA. The study group included women who underwent amniocentesis, while controls included women who did not undergo amniocentesis. Rates of chorioamnionitis, placental abruption, spontaneous preterm labor (sPL), preterm prelabor rupture of membranes (PPROM), neonatal birth weight < 2500 grams, 5 minute Apgar scores, intrauterine demise/stillbirth, neonatal intensive care unit (NICU) admission and GA at time of delivery were compared.

**Results/Findings:**
There were 41 patients in the study group and 37 patients in the control group. The study group did not have significantly different rates of chorioamnionitis (p=0.4251), placental abruption (p=1.000), sPL (p=0.1648), PPROM (p=0.4693), neonatal birth weight < 2500 grams (p=0.6171), 5 minute Apgar scores (p=0.7697), intrauterine demise/stillbirth (p=0.4963), and NICU admission (p=0.4275). Mean GA at time of delivery for both groups was 34 weeks (p=0.9770). There was no significant difference in delivery at < 28 weeks GA (p=0.7147) or delivery at < 34 (p=0.4077) or delivery > 37 weeks GA (0.3305).

**Conclusion:**
Amniocentesis prior to cerclage placement does not affect GA at delivery or increase rates of antenatal complications. Amniocentesis provides objective data, allowing for more individualized counselling prior to cerclage placement. The results of this study allow physicians to counsel patients about both the acute and long term risks of amniocentesis. The finding that amniocentesis prior to cerclage does not shorten interval to delivery answers one of the most common concerns
patients have regarding amniocentesis. The strengths of this study include a large sample size of 162 cases over a long time period of 10 years. The weaknesses of this study include the retrospective design and therefore subject to collection bias and the unknown number of patients that avoided cerclage due to amniocentesis findings. Future studies will focus on a prospective randomized controlled study with one arm undergoing amniocentesis prior to cerclage placement and a second arm undergoing cerclage placement without amniocentesis. Comparing these outcomes would allow for unbiased and clear valuation of amniocentesis as a pre-operative assessment tool.

References:

Category: Award

Title: Incidence of Coccydynia in Pregnancy: Comparison of Chart Review versus Patient Survey

Presenter: Alysha McFalls OMS IV

Objective:
The goal of this study was to characterize the incidence and risk factors for coccydynia associated with pregnancy as well as the postpartum period to allow for early identification and initiation of treatment. This will ideally lead to improved quality of life for patients experiencing coccydynia in pregnancy by decreasing the duration of pain and avoidance of the above-mentioned invasive treatment procedures.

Hypotheses:

1. Coccydynia in pregnancy or during the postpartum period will be more prevalent as documented by individual patient surveys than what is coded in the medical chart.
2. Patients who experienced coccydynia with previous pregnancies are more likely to experience coccydynia in subsequent pregnancies.
3. Coccydynia is more common in postpartum patients that experienced an instrumented or difficult vaginal birth than in patients without instrumented vaginal births.

Methodology:
This study had two parts: a retrospective chart review and a patient survey. The chart review, of three electronic medical record (EMR) systems from Kittitas Valley Healthcare, gathered characteristics of pregnant or up to 6-week postpartum patients seen over a three year period. The chart review also identified which of those patients experienced tailbone pain, determined by inclusion of ICD-9 code for coccydynia, to explore the incidence and characteristics of coccydynia. This was compared to similar data reported by pregnant or postpartum patients through a patient survey administered during routine office visits at two clinics in Ellensburg, Washington.

This study underwent Expedited (Non-Exempt) Review by PNWU IRB (#2018-17).

Chart review: Reviewed EMRs by:

Date: 01/01/15 to 12/31/17

- Appointment description
- Obstetric or PP appointments
- Diagnosis history reviewed for presence of coccydynia ICD-9 code
- Demographics tabulated in Excel spreadsheet without patient identifying information
- Separate key kept with patient names to avoid duplicates
- Patient Survey: Distributed and collected by nursing and medical assistant staff to patients
- Obstetric or PP appointments
- Administered over 6 week period
- Given after patient was roomed and vitals taken
- Patients advised to not fill out the survey if filled it out previously
- Survey responses tabulated in Excel spreadsheet

Results/Findings:
The incidence of coccydynia documented in the medical charts was low (0.9%, n=215), with all these cases occurring during the postpartum period. The survey results were quite different, with 46% (12 out of 26) of pregnant patients (95% CI, 21.4%-67.4%) and over 50% (5 out of 9) of postpartum patients surveyed reporting coccydynia (Table 1). Thus, the incidence of coccydynia documented in charts was significantly less than estimates obtained from direct patients surveys (p<0.0001, Fisher's exact test). Interestingly, the mode severity of coccydynia rated by currently pregnant patients was 7/10 on the pain scale, indicating a significant amount of pain experienced.

In the currently pregnant, multiparous patients, 5 of the 6 women who reported having coccydynia in an earlier pregnancy reported pain in their current pregnancy, whereas only 1 in 12 pregnant, multiparous patients had current pain, but no coccydynia in a previous pregnancy (Table 2). The difference between these two groups was significant (p=0.0039, Fisher’s exact test), indicating that coccydynia during pregnancy may be a risk factor for coccydynia in subsequent pregnancies.

The chart review gathered information from a wide range of patient profiles (Table 3) and identified 2 patients with a coccydynia ICD-9 code in their diagnosis history. Both of these patients had an unassisted vaginal birth. In the postpartum survey, 4 patients who reported experiencing tailbone pain had a vaginal birth, only one of which was instrumented. These data fail to suggest a correlation between instrumental vaginal birth and coccydynia.

The occurrence of treatment was different between patient surveys and chart review (Table 4). Of the 18 patients who reported coccydynia currently, in a previous pregnancy or in the postpartum period, only 2 surveyed patients reported receiving treatment whereas both patients identified by chart review with coccydynia had treatment ordered for it.

Conclusion:
An important finding in this study was that the incidence of coccydynia reported by patients was far more common than what was documented in medical records with a considerable amount of pain occurring in the prepartum period. Patient surveys revealed that pregnant patients were experiencing a moderate amount of pain (7/10), leading to questions as to why this was not coded in the medical record and treatment initiated. It is difficult to determine if coccydynia is under-reported or under recognized by physicians from these data. Certainly, pregnancy can be uncomfortable and patients may have expectations that their pain will resolve after birth, leading them to under-report their
symptoms. Likewise, physicians might be less concerned with a patient's tailbone pain if they are also experiencing multiple other somatic symptoms or more pressing medical issues such as preeclampsia and gestational diabetes.

Patient surveys also suggested that a possible risk factor for pregnancy-associated coccydynia was coccydynia in a previous pregnancy. This, along with the above findings, suggest that a time period exists during pregnancy where early intervention for coccydynia could be beneficial for the current, or perhaps even subsequent pregnancies. It is important to know how many women who experience coccydynia associated with pregnancy progress to need more invasive treatment procedures in order to determine how vigilant a physician should be in identifying and initiating treatment. Equally important for future research is evaluation of treatment modalities, including osteopathic manipulative treatment (OMT), and their effectiveness in treating pregnancy associated coccydynia.

References:


**Category:** Award

**Title:**
Effectiveness of Azithromycin for Prevention of Postoperative Infection After Nonelective Cesarean Delivery at a Community Hospital

**Presenter:**
Sarah L. Spencer, DO

**Objective:**

- Cesarean delivery is one of the most common procedures performed in the United States, and accounts for 32% of all deliveries annually. (1)
- Postpartum surgical site infection including wound infection and endometritis is a major cause of prolonged hospital stay and poses a burden to the health care system. (1)
- The risk of post-operative infection decreases with the use of pre-operative antibiotics (2)
- Post-operative infections still occur in up to 12% of women undergoing nonelective cesarean delivery with standard pre-incision prophylaxis; commonly a cephalosporin given before skin incision. (2)
- As many as 60 to 70% of all cesarean deliveries are nonelective (i.e., unscheduled cesarean section during labor, after membrane rupture, or for maternal or fetal emergencies). (2)
- In some studies, addition of a broader spectrum antibiotic, azithromycin, has been shown to further decrease the post-operative infection rates for patients who have undergone nonelective cesarean delivery. (2)
- In June of 2017, Henry Ford Health System initiated a protocol for administration of IV Azithromycin, in addition to standard pre-operative antibiotic prophylaxis, for patients undergoing nonelective cesarean delivery.
- Criteria for administration of Azithromycin included: patients having cesarean delivery who were at least 23w0d gestation and at least one of the following: membrane rupture for at least four hours, patients who had made cervical change of at least 1 centimeter, patients who were at least four centimeters dilated. (3)
- Patients were not given Azithromycin if they had an allergy to Azithromycin, had diagnosis of chorioamnionitis or anticipated need for antibiotics in the postpartum period, PPROM with last dose of Azithromycin administered less than eight hours prior to cesarean delivery. (3)
- The purpose of this study was to evaluate the effectiveness of a protocol for prophylactic azithromycin administration in preventing post-operative infection for patients undergoing nonelective cesarean delivery at a community hospital.
Methodology:

- A retrospective chart review was performed on all mothers undergoing non-elective cesarean delivery at Henry Ford Macomb Hospital from January 1, 2015 to May 31, 2018.
- A total of 921 women were included in the study.
- The patient’s electronic medical records were reviewed for documentation of postoperative infections including endometritis, superficial wound infection, deep wound infection, and other infections up to 6 weeks postpartum, duration of membrane rupture, IUPC use, use of staples or suture for closure, and baseline patient characteristics: patient age, gravidity/parity, gestational age, BMI, Smoking status, gestational diabetes, pre-gestational diabetes, chronic hypertension, and GBS status.
- The data was divided into two groups - those patients who underwent nonelective cesarean delivery prior to the initiation of azithromycin protocol and those patients who underwent a nonelective cesarean delivery after initiation of the azithromycin protocol.
- Data was used to compare postoperative infection rates between the two groups as well as to compare baseline patient characteristics.
- Data analyses were performed by the statisticians employed by Henry Ford Hospital using Independent t-test or Wilcoxon Rank Sum and Chi-Squared Test of Independence or Fischer’s Exact Test.

Results/Findings:

- The primary outcome of infection following nonelective cesarean delivery occurred in 65 women (9.5%) prior to initiation of the Azithromycin protocol and in 20 women (8.5%) after initiation of the Azithromycin protocol (P=0.6593).
- There were no significant differences in infection rate before and after initiation of the azithromycin protocol when looking at infections by subtype.
- Overall major post-operative infection rate was 5.7% before protocol vs 5.5% after protocol, P=0.93.
- Endometritis infection rate was 2.3% before protocol vs 3.4% after protocol, P=0.3734.
- Superficial wound infection rate was 3.6% before protocol vs 2.1% after protocol, P=0.2583.
- Deep wound infection rate was 0.4% before protocol vs 0.9% after protocol, P=0.6065.
- Other infections with rate of 3.4% before protocol vs 2.1% after protocol, P=0.3451.

Conclusion:

- Several large studies have shown a decrease in post-operative infection rates when Azithromycin is added to routine pre-operative prophylactic antibiotics in patients undergoing nonelective cesarean delivery.
- In this community hospital-based study, initiation of a protocol for administration of pre-operative azithromycin did not significantly decrease the post-operative infection rate in patients who had a nonelective cesarean delivery.
• While the overall infection rate did decrease, (9.5% to 8.5%, P = 0.6593) this result was not significant.

• This study was initially powered at 80% with a two-sided 0.05 alpha level to detect a surgical site infection rate of 2.8% or less and an endometritis rate of 9.4% or less, assuming that we would be able to review a total of 1050 charts. At the time the study was completed, only 921 patients had met inclusion criteria. (N = 686 prior, N = 235 after) thus this study may not have been adequately powered.

• Changes in hospital policy and initiation of new protocols often do not occur at one hundred percent compliance immediately following implementation; thus, there may have been patients in the “after” group who met criteria for azithromycin administration but did not receive the medication.

• Additionally, several of the patient and delivery baseline characteristics were significantly different. In particular, betamethasone administration was significantly higher in the “after” group (6% vs 14%, P=0.0001), use of staples for skin closure was higher in the “prior” group (62% vs. 52%, P=0.0075) and suture skin was used more frequently in the “after” group (37% vs. 46%, P=0.0127). It is unclear if these differences affected outcomes in this study, however further evaluation of these particular variables may help to explain the findings in this study.

• Further studies addressing the use of azithromycin for preoperative prophylaxis of nonelective cesarean deliveries in the community setting will help to direct use of hospital protocols for administration of azithromycin in the future and will help to improve quality of patient care.

References:


Category: Award

Title: Cesarean Section vs Vaginal Delivery Rates of Elective Inductions at Henry Ford Macomb Hospital

Presenter: Kathryn Klayum, DO

Objective: The cesarean section rate at Henry Ford Macomb Hospital has been consistently higher than the other hospitals in the Henry Ford Health System. At times the cesarean section rate has approached 40 percent or greater.

This study aims to look at rates of cesarean section in regards to several factors during the induction process, specifically elective inductions, to examine why the cesarean section rate is elevated at Henry Ford Macomb and to evaluate what can be done to lower the cesarean section rate in the future.

Methodology: A retrospective chart review was performed on all inductions at Henry Ford Macomb Hospital from October 2014 to December 2016.

Their charts, on electronic medical record were reviewed for documentation. Data recorded included date of induction, gravidity and parity, gestational age at time of induction, delivering physician, bishop score, reason for induction, method of induction, dilation at time of induction and at time of artificial rupture of membranes, route of delivery and indication for cesarean section if indicated.

A total of 1,049 women were included in the study.

This data analysis was reported in the form of means, standard deviation, medians and ranges for continuous variables. Categorical variables were reported in the form of frequencies and percentage. Estimates for averages and proportions also included 95% confidence intervals.

Chi square tests were used for categorical variables, and t-test for continuous variables. The statistical analysis was obtained by using SAS 9.4, and the tests were claimed to be significant if the p-values were less than 0.05.

Results/Findings: The cesarean section rate for elective inductions was 14.4% and for medical inductions it was 25.9% (p=0.001, OR 0.48, 95% CI 0.35, 0.66).
When looking at nulliparous versus multiparous for elective inductions, the elective nulliparous cesarean section rate was 31.1% and multiparous elective induction cesarean section rate was 4.2% (p=0.001).

Looking all inductions, medical and elective, the cesarean section rate for multiparous women was 5.9% and nulliparous women 35.1% (p=0.001, OR 0.11, 95% CI 0.08, 0.17).

When the induction methods were compared for elective inductions, the cesarean section rate for those induced with Cervidil was 16.7%, with Cytotec it was 28.0% and for Pitocin it was 9.8% (p=0.001).

The average bishop score for vaginal delivery was 5.64 and for cesarean section it was 4.17 (p=0.001, OR 0.69, 95% CI 0.63, 0.76).

The average dilation at time of induction for patients that had a vaginal delivery was 2.24 cm and for cesarean section 1.2 cm (p=0.001, OR 0.45, 95% CI 0.38, 0.53).

Most common indications for cesarean section were FTP (failure to progress: failed induction of labor, arrest of dilation, cephalopelvic disproportion, arrest of descent, maternal exhaustion) and non-reassuring fetal heart tones.

**Conclusion:**

The cesarean section rate has been gradually rising since the 1970s. Now cesarean section is the most common surgery performed. A cesarean section poses more risks to the patient, both acutely and long term. The cesarean section rate at Henry Ford Macomb Hospital has been consistently higher than the other hospitals in the Henry Ford system. We suspected the number of elective inductions may be contributing.

The elective induction cesarean section rate is 14.4% which is lower than expected. If medical inductions are included, the rate is higher at 25%. Considering nulliparous patients versus multiparous patients, one in three of elective inductions resulted in cesarean section in a nulliparous patient and this is much lower for a multiparous patient, which is one in twenty-five.

Elective inductions with cervical ripening with Cytotec, inductions with an unfavorable cervix (Bishop score 2-5, initial dilation of 0-1 cm), and artificial rupture of membranes at 1-2 cm all had higher rates of cesarean section.

How can cesarean section rates at Henry Ford Macomb Hospital be reduced in the future? Providers were encouraged to adhere more strictly to the ACOG/SMFM guidelines when diagnosing a labor dystocia. They were also told to be mindful when scheduling inductions and deciding who is an appropriate candidate.

This study is in contrast to recent study by Grobman et al, showed induction at 39 weeks can decrease rate of cesarean section. The rate of cesarean section was lower in the induction group 18.6% versus EM group 22.2%. Also, the rate of GHTN and preeclampsia was lower in the induction group. For these patients, 63.5% of patients had an unfavorable cervix (bishop <5).
For future research, examining the accuracy of the diagnosis of labor dystocia in patients who have cesarean section may be useful to see how providers are adhering to guidelines.

References:


**Category:** Award

**Title:**
Effect of Patient Centering on Buprenorphine Compliance in Pregnant Patients

**Presenter:**
Jessica Wilson, DO

**Objective:**
- To look at the effect of Centering on buprenorphine compliance in pregnant patients
- Due to small N, the objective was expanded to also look at the women enrolled in the Perinatal Hope Program at Allegheny Health Network, to see if the patient-centered medical home model will impact outcomes.

**Methodology:**
- Retrospective chart review from 7/1/16 – 3/31/18
- 3 groups:
  - Perinatal Hope Program + Centering group (PHP + Centering) (Only patients enrolled in the Perinatal Hope Program and the Centering Program)
  - Perinatal Hope Program total group (PHP) (this group contains all patients in the Perinatal Hope Program, including those enrolled in centering)
    - This group was further broken down into two groups in order to perform a direct comparison
      - PHP + Centering (same group as #1)
      - PHP Only (Patients only enrolled in the Perinatal Hope Program, not enrolled in Centering)
  - Control group (women presenting to labor and delivery on buprenorphine, not enrolled in the Perinatal Hope Program)
- Primary outcome: Negative urine drug screen for opiates at the time of delivery compared between groups
- Secondary outcomes: UDS for buprenorphine, gestational age, birth weight, Apgars at 1 and 5 minutes, fetal viability, neonatal length of stay, medications for neonatal abstinence syndrome, neonatal demise
- SPSS and Matlab R2011a were used to evaluate data, P<0.05 significance
- T test for continuous variables, Fischer Exact test for categorical variables
- Assuming 17% positive UDS rate in controls, 48 needed in test and 96 in control for 80% power
Results/Findings:

- No significant difference in maternal characteristics between groups.

Table 1. Perinatal Hope Program + Centering (PHP + Centering) compared to control group for primary and secondary outcomes. *denotes significance

- Table will be available to be viewed on poster

In brief:

- Primary outcome of UDS for opioids at delivery: PHP + centering 8.3% positive vs Control 10% positive p = 0.72
- Number of prenatal visits: PHP + centering 15.25 (SD 4.56) vs Control 8.33 (SD 5.27) p = 0.001*
- Neonatal length of stay: PHP + centering 8.0 (SD 4.16) vs Control 14.08 (SD 15.6) p = 0.186
- Remaining secondary outcomes not significant nor trending certain direction

Table 2. Perinatal Hope Program total (PHP) compared to control group for primary and secondary outcomes. *denotes significance

- Table will be available to be viewed on poster

In brief:

- Primary outcome of UDS for opioids at delivery: PHP 10% vs Control 10%
- Number of prenatal visits: PHP 11.83 (SD 5.98) vs Control 8.33 (SD 5.27) p = 0.0054*
- Neonatal length of stay: PHP 9.9 (SD 6.697) vs Control 14.08 (SD 15.6) p = 0.1602
- Remaining secondary outcomes no significant nor trending certain direction

Table 3. Perinatal Hope Program only (PHP Only) compared to Perinatal Hope + Centering (PHP + Centering) for primary and secondary outcomes. *denotes significance

- Table will be available to be viewed on poster

In brief:

- Primary outcome of UDS for opioids at delivery: PHP only 15.7% vs PHP + centering 8.3% p = 0.369
- Number of prenatal visits: PHP only 9.53 (SD 5.79) vs PHP + centering 15.25 (4.65) p = 0.0072*
- Neonatal length of stay: PHP 11.21 (SD 6.49) vs PHP + centering 8.0 (SD 4.16) p = 0.139
**Conclusion:**

- No significant difference in rate of positive urine drug screen between groups but trend towards lower rate in PHP + centering vs control and PHP + centering vs PHP only
  - Sample size small, power not met
  - Percentage lower in control group than expected (10% vs 17%), therefore much high N needed to reach power
  - Number of Prenatal visits were significantly higher in PHP + centering vs control, PHP vs control and PHP + centering vs PHP Only
  - Future research could aim to see if this reduces triage visit
- Trend towards shorter neonatal length of stay in PHP + centering vs control and PHP vs control
- Could reach significance with higher N
- Future research needed to investigate, could be a potential link to breastfeeding
- Huge financial implication, 24 hours in NICU alone (no other interventions) at AHN costs $2,000

**References:**

1. Ickovics, JR., Trace, KS., Westdahl, C., Schindler, S., Klima, C., Reynolds, H., Magriples, U. Group Prenatal Care and Preterm Birth Weight: Results from a matched cohort study at public clinics. 2003. 1051-1057
4. Mattick, RP., Kimber J, Davoli, M. Buprenorphine maintenance vs placebo or methadone maintenance for opioid dependence (Review). Cochrane Database of Systematic Reviews 2014 1-76
Category: Award

Title: Readmission Rates: Exploring Hypertensive Disorders in the Postpartum Period– A Multicenter Observational Cohort Study

Presenter: Bertha Vasquez, DO

Objective:
Hypertensive disorders of pregnancy are a common problem worldwide and are one of three factors of maternal mortality in the reproductive age. According to American studies, 18.2% of maternal deaths occur due to hypertensive disorders in pregnancy. The exact prevalence of postpartum hypertension (HTN) and preeclampsia is difficult to ascertain because most women in the postpartum period will not have their blood pressure (BP) checked until the 6-week postpartum visit. In addition, most women with HTN usually are asymptomatic, and those with symptoms frequently are seen and managed in Emergency Department. As per the HTN in Pregnancy Task Force 2013 guidelines, for women in whom gestational HTN, preeclampsia, or superimposed preeclampsia is diagnosed, it is suggested that BP be monitored in the hospital or that equivalent outpatient surveillance be performed for at least 72 hours postpartum and again 7–10 days after delivery or earlier in women with symptoms. The goal of our study was to study the association between elevated BP at admission for delivery and unplanned 42 day-readmission rate.

Methodology:
A multi-center observational retrospective cohort study using electronic health record chart review of women who labored and delivered from October 1, 2016, to November 31, 2018, in eight community hospitals of Central Pennsylvania. Readmission was defined as an admission to an acute care hospital within 42 days of discharge from an acute care hospital. The data was stratified by other co-variables such as delivery type—preterm (20 0/7 weeks of gestation through 36 6/7 weeks gestation), early term (37 0/7 weeks of gestation through 38 6/7 weeks of gestation), full term (39 0/7 weeks of gestation through 40 6/7 weeks of gestation), late term (41 0/7 weeks of gestation through 41 6/7 weeks of gestation), and post term (42 0/7 weeks of gestation and beyond); mode of delivery such as vaginal/ caesarean; severity of preeclampsia with and without severe features; usage of magnesium sulfate for seizure prophylaxis; discharge time and disposition; total length of stay; and comorbidities. Student’s t-test was used to analyze between-group differences for the continuous variables, and chi-square test to analyze between-group differences for the categorical variables. Odd’s ratios with 95% confidence intervals were also reported. A p < 0.05 was considered statistically significant. All the analyses were done using SAS ver 9.4 (SAS Institute, Cary NC).
Results/Findings:
Of 10,275 deliveries, 757 patients were readmitted within 42 days of delivery (7.37%) and 1160 patients had a diagnosis of HTN during admission for delivery. The mean age of readmitted patients was 28.7 years. The readmission group consisted of more African-Americans (28.27% vs 16.14%, p < 0.0001), morbidly obese (30.52% vs 23.63%, p < 0.0001), cesarean sections (42.01% vs 30.42%, p < 0.0001) and preterm deliveries (12.42% vs 9.24%, p = 0.004) compared to the no readmission group. The readmission cohort had a longer average length of stay from delivery to discharge with a mean of 80.2 hours (p < 0.0001). Prevalence rates in the group having any of the selected hypertensive diagnoses on admission for delivery, showed more blood pressure measurements (mean of 87.8 vs 45, p < 0.0001), African-Americans (22.7% vs 16.31%, p < 0.0001), average length of stay from delivery to discharge (mean of 96.6 vs 68 hours, p < 0.0001), advanced maternal age (22.59% vs 18.09%, p = 0.0002), patients with a body mass index ≥ 25 (80.09% vs 72.45%, p < 0.0001), and multiple gestations (6.29% vs 2.92%, p < 0.0001) compared to the group not having the diagnoses. The patients with hypertensive diagnoses during admission for delivery received more magnesium sulfate (36.03% vs 2.75%, p < 0.0001) and had more readmissions within 42 days (10.86% vs 6.92%, p < 0.0001), of which 1.47% readmissions were for one of the hypertensive diagnoses (p < 0.0001). In our study, the risk of readmission for one of the hypertensive diagnoses within 42 days of delivery was increased with African-Americans (OR 1.981, CI 1.672-2.346, p < 0.0001), patients delivered by cesarean section (OR 1.664, CI 1.426-1.940, p < 0.0001) and reduced with smokers (OR 0.232, CI 0.095-0.564, p < 0.0013) and multiple gestations (OR 0.629, CI 0.396-1.001, p < 0.0506).

Conclusion:
Patients with one of the selected hypertensive diagnoses during their admission for delivery, had an increased risk of readmission for the hypertensive diagnoses. Having a significant number of readmissions in patients with HTN on delivery admission being readmitted for HTN diagnosis suggests that further evaluation of the management of blood pressures both prior to and after discharge is warranted.

References:


Despite strong support of breastfeeding by organizations such as the American Academy of Pediatrics, the American Congress of Obstetricians and Gynecologists, and the American Academy of Family Physicians, the rate of breastfeeding initiation at the time of delivery and continuation at 6 months postpartum is well below the Center of Disease Prevention’s Healthy People 2010 goals.\(^1\) The United Nations Children’s Fund (UNICEF) and the World Health Organization (WHO) have estimated that if all babies were breastfed for a minimum of the first six months of their lives, the rate of morbidity and malnutrition would significantly decrease across the world.\(^2\) As a result, WHO and UNICEF launched the Baby-Friendly Hospital Initiative (BFHI) in 1991 to encourage proper infant feeding practices starting at birth. The initiative includes ten steps which the hospital must meet and maintain to obtain certification. Step Four of the BFHI aims to “help mothers initiate breastfeeding within one hour of birth,” and skin-to-skin contact between mother and baby is encouraged in support of this goal.\(^3\)

Skin-to-skin contact (SSC) on a mother’s chest immediately following birth provides thermoregulation, physiological stability, appropriate stimulation for the infant, and encourages bonding and breastfeeding.\(^4\) Previous work demonstrates that early SSC is positively associated with breastfeeding from discharge through 3 months postpartum.\(^5\) However, there are significant obstacles to SSC and breastfeeding including insufficient prenatal education, disruptive obstetrical practices, and a lack of family and societal support.\(^6\) These barriers are more prevalent amongst vulnerable groups, which include low income, poorly educated, and black populations.\(^2\) Delivery room and postpartum hospital routines can also hinder initiation of SSC and significantly disrupt early maternal-infant interactions.\(^7\) While initiatives such as BFHI may combat some of these obstacles, guidelines for primary care-based interventions originating in a clinician’s office currently do not exist.\(^8\)

In this study we sought to evaluate the impact of prenatal video education on pregnant women’s intention to practice SSC after birth. We hypothesized that by providing SSC education in a video format immediately before delivery we would encourage participation in SSC after delivery.\(^9\) This timing would allow the topic to be remembered clearly and allow patients to engage in an active dialogue with the staff that will be preforming the delivery. The goal of educating mothers was not only to increase their knowledge and skills but also to influence their attitudes.\(^10\) By providing a video which models SSC to all non-emergent anticipated vaginal deliveries upon admission to the
hospital, our hope was to encourage patients to actively participate in SSC at the time of delivery and become their own advocates for SSC.

**Methodology:**

**Patient Selection**

Study participants were recruited at the time of admission to Labor and Delivery by an Obstetrics and Gynecology Resident at Southview Medical Center. Patients met inclusion criteria for this study if they were admitted with anticipation of a normal spontaneous vaginal delivery within one week of the time of admission, were greater than 37 weeks gestational age, fluent in the English language, and over the age of 18. Patients in an unstable medical condition or any woman appearing to be in a cognitive or emotional state that would prevent informed consent were excluded from the study.

**Study Design**

Following recruitment, patients were immediately randomized into no video (Group A – control) and video groups (Group B – experimental). Patients assigned to Group B watched a video titled “Jumping into Kangaroo Care” developed by the Ohio Department of Health. The video is 8 minutes and 52 seconds in length. It discusses the benefits and logistics of Kangaroo Care, a commonly used approach to SSC, from both the professional’s and new mother’s perspective.

Randomization occurred in the order that the patient was enrolled in the study. If an eligible patient wished to participate in the study, the resident obtaining consent consulted the list of patients to determine if that patient would be in Group A or Group B. The first patient enrolled was in Group A and asked a pre-survey regarding:

- their intention to practice skin-to-skin at the time of delivery
- if they participated in skin-to-skin in a previous pregnancy
- if they had any formal training about skin-to-skin
- and if they did have formal training was it either
  - provided at a prenatal appointment,
  - or a formal class led by either a nurse or a lactation consultant.

The second patient enrolled was in Group B and took the same pre-survey, watched the “Jumping into Kangaroo Care” video, and then took the post survey which asked if they intended to practice skin-to-skin at the time of delivery. The third patient enrolled would take only the pre-survey and be in Group A, etc.

The Institutional Review Board at Kettering Health Network approved this project prior to registration with clinicaltrials.gov. This trial was single blinded – meaning the patients did not know what group they were in when they agreed to participate in the study. Residents were not blinded in order to recruit patients for the study and continue to participate in deliveries.
Statistical Analysis

Sample Size Calculation: We employed interim analysis based on a recruitment goal of 240 patients and adopted “two looks” at the data to determine statistical significance. The first look occurred after recruiting 120 women (60 per group) and the second look after reaching the goal of 240 women (120 per group). We used cut-off points of \( z=3.5 \) for first look and \( z=2.0 \) for second look11 to determine if the study needed to be continued. Hypothetically, had 50% of Group A and 80% of Group B intended to participate in SSC (30% difference in proportion) during the first interim analysis, 50% interim sample size (120 patients) would result in an absolute \( z \)-statistics of 4.89 and data collection would have ended. However, given our smaller difference in proportions on first look, data collection was continued until 240 patients were recruited in order to obtain statistical significance.

Descriptive characteristics were presented as mean (+/- standard deviation) for continuous data and sample size (percentage) for categorical data. Continuous variables were compared using z-test and categorical variables were compared using chi-squared test. Dichotomous outcomes were further analyzed using logistic regression with adjustments for clinically and statistically significant variables. All statistical tests were 2-sided and \( p \)-values <0.05 were considered statistically significant. SPSS (IBM Corp.) version 22 was used for data analysis.

Results/Findings:

In the quarter prior to this study, Southview Medical Center initiated SSC in 50% of eligible vaginal deliveries (i.e. greater than 37-weeks’ gestation with a 5-minute APGAR of 7). Our goal as a hospital per BFHI is 82%.

Intention to Participate in SSC Before and After Video Education

There were no significant differences between the two randomized groups of patients in terms of demographics, comorbidities, and obstetric measures. Most respondents indicated that they planned to use SSC after delivery both pre and post intervention. During the pre-intervention survey there was no difference in intent to use SSC between the two groups with 89.2% (\( n=107/120 \)) of the video group indicating intent to use SSC compared to 83.3% (\( n=100/120 \)) of the no-video group (\( p=0.396 \)). However, after watching the video the percentage of patients intending to use SSC after delivery increased to 98.3% (\( 118/120; \ p<0.001 \)).

Effect of Video Intervention On Time From Delivery to Start of SSC

Of the 240 patients included in the study, 63 patients proceeded to cesarean section or did not complete SSC due to fetal acuity, maternal acuity, or maternal refusal. As such, 177 (73.8%) were included in the analysis for time to SSC. The video group trended towards higher rates of initiating SSC within 5 minutes of delivery (59.8% [\( n=55/92 \)]) compared to those in the non-video group (49.4% [\( n=42/85 \)]), however this difference was not statistically significant (\( p=0.17 \)).
Effect of Prior Formal Education by Physician/Nurse/Lactation Consultant on Time to SSC

Of the 177 patients, 58 (32.8%) reported formal education before they were included in the study and 119 (67.2%) did not report any formal education. A higher proportion of those who reported formal education beforehand started SSC within 5 minutes (62.1% [n=36/58]) as compared to those who did not report formal education (51.3% [n=61/119]), however, the difference was not statistically significant on bivariate (p=0.18) or regression analysis (Odds Ratio 1.55, 95% Confidence Interval: 0.82-2.95).

A subanalysis was performed for only those who did not have any formal education before joining the study (n=119), which demonstrated that a greater proportion of patients in the video group initiated SSC within 5 minutes of delivery compared to those in the non-video group (59.7% [n=37/62] versus 42.1% [n=24/57], p=0.04).

**Conclusion:**
In this study we found that following the video intervention individuals were significantly more likely to demonstrate interest in SSC. Despite the fact that 91% of the complete cohort planned to initiate SSC immediately after delivery, only 60% of eligible individuals in the video group started SSC within 5 minutes of delivery and only 50% started SSC in the non-video group. This likely occurred due to other barriers to SSC outside of patient education, including but not limited to staff education and clinical culture. Finally, we found that formal education prior to delivery trended towards preforming SSC within five minutes, but that this finding was not statistically significant.

Patient education can easily influence behaviors without requiring substantial effort on behalf of providers and different options must be considered when attempting to improve SSC rates. If we consider efforts made to improve breastfeeding rates, we see that patient education programs have the single greatest effect of any single intervention on both initiation and short term duration for breastfeeding. For example, women who attend breastfeeding classes with lactation consultants are more likely to continue breastfeeding at six months when compared to controls. Currently, common office practices include provision of written materials and discharge packets. However, neither practice effectively increases rates of breastfeeding and discharge packets have even been shown to reduce the rates of breastfeeding. As such, written documents would not likely improve SSC rates. Ideally, antepartum appointments should include education on the benefits of both breastfeeding and SSC. However, in a busy clinic setting with a vulnerable patient population, the ability to provide extra educational classes is not always an option, and this study demonstrates the alternative option of video education at the time of delivery. By watching the video shortly before delivering, patients will have the topic of SSC fresh in their minds when it comes time to decide how to interact with their new baby. Video intervention may also be an effective approach for other perinatal interventions, including breastfeeding, diet/exercise, immunizations, and smoking cessation.

As demonstrated in this study video education has the potential to not only inform but also effect change. Video has the capability to present a lot of complex information quickly, simply, and clearly. One study found that patients who viewed videotapes that discussed treatment options
had a greater understanding of the risks and benefits of those choices and were more apt to be active participants in decision making. Audio-visual material can also be useful for those who have limited literacy skills. Moreover, the information provided to patients on video has the advantage of being repeatable and consistent, which allows practitioners to provide the same information to all our patients. This type of intervention is ideal for the perinatal setting given the need to provide accurate information quickly and in a manner that applies to most pregnant patients.

Through this randomized controlled study, we can conclude that video education at the time of admission improves a patient’s intent to participate in SSC. However, while a trend was present, there was no statistically significant difference in a patient’s participation in SSC within five minutes of delivery. These findings support that additional barriers, other than prenatal education, may affect a patient’s completion of SSC. That said, this study provides an easily implementable tool that can motivate new mothers to engage in evidence-driven practice with the potential to improve both mother and infant wellbeing.

References:

7. Moore ER, Anderson GC, Bergman N. Early Skin-to-Skin Contact for Mothers and Their Healthy Newborn Infants. Cochrane Database of Systematic Reviews. 2007;(3):CD003519.


Objective:
The objective of this postgraduate thesis for the American College of Osteopathic Obstetricians and Gynecologists is to present the research performed over the course of my residency training and future directions therein involving novel application of osteopathic concepts and treatment in the diagnosis and management of clinical situations within obstetrics and gynecology. Specific topics include:

- osteopathic obstetrical management to shorten the duration of labor in the inpatient setting
- management of cesarean deliveries and cesarean scars with osteopathic manipulative treatment
- using somatic dysfunction in the diagnosis of uncommon ectopic pregnancies with surgical correlation and comparison with related pathologic findings

The work presented in this thesis is intended to serve as a basis for further research into these concepts and clarifying not only clinical outcomes but underlying pathophysiology.

Methodology:
This thesis is divided into three separate research studies. Regarding management of labor, we conducted a prospective observational pilot study between June 2017 to September 2017, where all intrapartum patients were offered a standardized OMT protocol as part of their labor management. With regards to cesarean deliveries and cesarean scars, we present a prospective case series of 4 cases of cesarean delivery in which OMT was successfully integrated: primary cesarean delivery, repeated cesarean delivery, TOLAC, and cesarean scar ectopic pregnancy managed with methotrexate. Regarding ectopic pregnancies, we conducted a prospective case series where a focused OSE was performed on each patient with an ectopic pregnancy at her initial presentation after the patient history but before other diagnostic or laboratory tests were performed and surgical treatment was initiated. Chapman reflex points (CRPs) were evaluated pre- and postoperatively. For comparison, patients who had otherwise normal first pregnancies, underwent elective postpartum bilateral tubal ligation, or had simple ovarian cysts were also included and received OSEs.

Results/Findings:
Labor Management:

The study included a total of 100 patients with 50 patients in each arm. All patients had complete follow-up and treatment data. The patient population was ethnically diverse consisting of 16 %
Middle Eastern (n = 8), 16% Black (n = 8), 32% Asian (n = 16), 12% Hispanic (n = 6), and 24% White (n = 12) for the OMT group, and 10% Middle Eastern (n = 5), 8% Black (n = 4), 40% Asian (n = 20), and 22% White (n = 11) for control. Patient demographic information is summarized in Table 1 and included maternal age, if patient initially presented in latent labor, parity, and gestational age at time of delivery. Total labor duration in the OMT versus control group resulted in 11.34 ±6.62 (1.1-27) hours versus 16.57 ±4.39 (1-58.8) hours, p = 0.03 respectively. All other measures did not achieve statistical significance including total labor times when divided between primiparous and multiparous patients, presence of meconium-stained amniotic fluid and need for cesarean delivery, which is likely because each individual group did not achieve the n=87 threshold required through the power analysis. 90% of patients in the OMT group had positive Chapman’s point for the uterus and 100% had positive Chapman’s points for the broad ligament before delivery whereas 30% of patients had positive uterine Chapman’s points and 5% had positive Chapman’s points for the broad ligament following delivery.

Cesarean Deliveries and Cesarean Scars:

For cases of primary cesarean delivery, the outcome was considered successful if blood loss was less than or equal to 1000 mL as determined by estimated blood loss; pre- and postpartum hemoglobin levels were between 12.0 and 15.5 g/dL; pre- and postpartum hematocrit was between 37% and 48%; meconium-stained amniotic fluid (MSAF) was absent; at the 2-week follow-up appointment the cesarean scar (subcuticular suture closure) showed full-thickness and was intact and healed; and no other postpartum complications occurred. For repeated cesarean deliveries, the outcome was considered successful with the same criteria for primary cesarean deliveries in addition to lack of uterine rupture (especially in patients with 4 or more cesarean deliveries, when such a risk is increased). For TOLAC, the outcome was considered successful if blood loss was less than or equal to 500 mL as determined by estimated blood loss; pre- and postpartum hemoglobin levels were between 12.0 and 15.5 g/dL; pre- and postpartum hematocrit was between 37% and 48%; MSAF was absent; uterus did not rupture; and no other postpartum complications occurred. For cesarean scar ectopic pregnancies, the outcome was considered successful if β-human chorionic gonadotropin (hCG) levels decreased and the ectopic pregnancy was resolved without complications, such as ectopic pregnancy rupture or need for additional methotrexate administration. For our prospective case series, all criteria were met.

Ectopic Pregnancies:

From this case series, several conclusions can be drawn. Despite the variations of ectopic pregnancy locations, somatic dysfunctions were consistently identified at T10-L2, and this finding is absent when compared with otherwise normal first pregnancies in the first and second trimesters. For ectopic pregnancies of the ovary, it appears that when a CRP is identified, it usually corresponds to only the outer half of the ovary where the pregnancy had actually ruptured. It is unknown if an intact ovarian pregnancy of the inner half would have the same CRP identified. Hemoperitoneum on its own is not likely to be the main cause of CRPs or somatic dysfunctions given the variations of these components in the different cases presented and that all but 1 case had hemoperitoneum. Cornual ectopic pregnancies do not appear to elicit CRPs, unlike pregnancies of the fallopian tube,
ovary, and omentum. The somatic dysfunction and CRP findings present in ectopic pregnancies of uncommon locations are not likely to be confounded by other conditions of the uterus, fallopian tubes, and ovaries as evidenced by the findings presented for otherwise normal pregnancies, elective bilateral tubal ligation, and simple ovarian cysts. The OSE findings described in this case series are important because they enhance the initial diagnostic workup, which is essential in emergent situations like ectopic pregnancies, where prompt intervention is necessary and concrete diagnostic information is unavailable. The OSE findings demonstrated in these cases correctly aided in the final diagnosis and thus can potentially prove helpful in cases of ovarian, fallopian tube, and omental pregnancies to provide clues to ectopic pregnancy of uncommon locations where diagnostic imaging results are insufficient or equivocal. Such information allows the osteopathic physician to better prepare for treatment approaches, which in the cases of ruptured ectopic pregnancies is surgical.

**Conclusion:**
The research presented in this postgraduate thesis for the American College of Osteopathic Obstetricians and Gynecologists presents a foundation of novel applications of core osteopathic diagnostic and treatment modalities for common clinical situations in the field of obstetrics and gynecology. Further research is required to establish these concepts more definitively in term of efficacy and pathophysiology. It is my goal to continue this research with this preliminary work as a basis and it is my hope that this work will allow both practicing clinicians and researchers to apply these concepts to their patient care and own individual research projects.

**References:**


**Objective:**
To analyze patterns of disease recurrence in patients with apparent uterine-confined endometrial cancer (EC) who underwent robotic sentinel lymph node mapping (SLNM) followed by hysterectomy ± completion lymphadenectomy.

**Methodology:**
A database analysis was performed on 417 patients with uterine-confined EC who underwent robotic hysterectomy and SLNM ± completion lymphadenectomy (LA) from 03/2011 to 08/2016. Patients were divided into low-risk (stage IA endometrioid histology of any grade) and high-risk subgroups (all others, including non-endometrioid histologies). 60 (14.4%) patients were lost to follow-up at less than 12 months. The remaining 357 patients were analyzed for disease recurrence, disease site, prior therapies, sentinel lymph node (SLN) assessments, and surgico-pathological findings. Frozen section was used to determine need for para-aortic LA.

**Results/Findings:**
Mean age and BMI of 417 patients was 64.9 ± 10.2 years and 33.2 ± 8.3 mg/m2 (range 17.8-63.0). Histologies included 357 (85.6%) endometrioid (59.7% G1, 31.1% G2, and 9.2% G3) and 60 (14.4%) high-risk subtypes. 204 patients (48.9%) received completion pelvic LA, 188 (45.1%) had pelvic with para-aortic LA, and 25 (6.0%) had SLNM only. Mean SLNs was 3.5 ± 2.6, pelvic 15.0 ± 9.0, and para-aortic nodes 8.2 ± 6.3. 229 (54.9%) cases were low-risk and 188 (45.1%) were high-risk. Adjuvant therapy was 11 (2.6%) EBRT, 74 (17.8%) EBRT with chemo, 65 (15.6%) chemo ± brachytherapy, 16 (3.8%) brachytherapy alone, and 251 (60.2%) no therapy. Mean follow-up time from surgery was 26.8 ± 20.0 months (range 0-77). 24/357 (6.7%) patients had recurrence at a mean 20.9 ± 12.6 months (range 4-43). Recurrence occurred in 7/195 (3.6%) low-risk patients and 17/162 (10.5%) high-risk patients. Recurrent disease was identified in 17/357 (4.8%) endometrioid and 7/60 (11.7%) high-risk subtypes. Sites of disease recurrence were 5 (1.4%) vaginal cuff, 4 (1.1%) retroperitoneal pelvic, 3 (0.8%) aortic, 10 (2.8%) peritoneal, and 8 (2.2%) systemic. 6 patients had more than 1 recurrence site. 13/24 recurrences were in stage I/II patients and there were no retroperitoneal node recurrences in this group. All 7 retroperitoneal recurrences were detected in stage III patients.

**Conclusion:**
Patients with apparent uterine-confined EC undergoing SLN mapping and use of adjuvant therapies...
based on GOG risk status had excellent retroperitoneal control. There were no retroperitoneal recurrences in stage I/II patients.
OPEN CATEGORY ABSTRACTS
**Category:** Open

**Title:**
Hyponatremia and Paradoxical Combination of Clotting Cascade Disorders Complicating Vaginal Delivery

**Presenter:**
Jason Wheatley, DO

**Objective:**
To present the first case of management of labor in a patient with paradoxical combination of clotting cascade disorders complicated by hyponatremia.

**Methodology:**
Electronic health data (EHR) was reviewed for patient records including but not limited to admission notes, laboratory findings and imaging studies. Patient consent was obtained and IRB approval was secured.

**Results/Findings:**
A 35-year-old G3/P1011, with known vWD and protein C and S deficiencies, was induced with Oxytocin at 36 weeks’ gestation for abdominal pain secondary to bilateral ovarian masses. She was managed with Desmopressin postpartum as recommended for patients with vWD. Following an uncomplicated postpartum course she was discharged on the second day. She returned to the hospital two days post discharge with severe mental status changes secondary to hyponatremia. The additive effect of Oxytocin and Desmopressin on the kidneys led to severe anti-diuresis. She was managed with hypertonic saline and oral fluid restriction with subsequent recovery and discharge.

**Conclusion:**
Patients with co-existing diagnoses of thrombophilia’s and vWD require a high level of vigilance at time of induction and in the postpartum period. Management should be focused on preventing electrolyte abnormalities while at the same time guarding against venous-thromboembolic disease and postpartum hemorrhage. Specifically, serial hemoglobin and electrolyte evaluation should be implemented after delivery and compared to values on admission when vWD therapy is administered.

Awareness of the increased risk of these outcomes allows for the optimization of care during the early (three to four) postpartum days.
References:

Category: Open

Title: Delayed Uterine Inversion

Presenter: Casey Carney, DO

Objective: Uterine inversion is a rare obstetric emergency that typically presents acutely following the third stage of labor with hemorrhage, shock, and possible maternal death if not promptly diagnosed and treated. There are rare incidences of delayed uterine inversion.

Methodology: N/A

Results/Findings: 28 year old Gravida 1 Para 0 presented to labor and delivery and delivered a full term infant via vacuum assisted vaginal delivery. The placenta was delivered without complication. A postpartum hemorrhage secondary to uterine atony was treated with uterine massage, cytotec, and methergine. Postpartum day 1, the patient required removal of retained products of conception in the operating room. Five weeks postpartum, the patient presented with continued vaginal bleeding. An erythematous friable mass filling her vagina was diagnosed as a hematoma and managed conservatively. Several weeks later, a second physician suspected the mass was a prolapsing fibroid. An exam under anesthesia was performed. Uterine inversion was suspected and confirmed through exploratory laparotomy. A total abdominal hysterectomy was performed.

Conclusion: Most cases in the literature are of acute puerperal uterine inversion following the third stage of labor which makes this case of delayed uterine inversion unique. Several differential diagnoses were made prior to the correct diagnosis. The importance of this case is to consider uterine inversion in the differential when a patient presents with continued vaginal bleeding and a friable vaginal mass postpartum.

References:

**Objective:**

SCD is a group of inherited single-gene autosomal recessive disorders caused by the ‘sickle’ gene, which affects hemoglobin structure. The term SCD includes sickle cell anemia (HbSS) and the heterozygous conditions of hemoglobin S and other clinically abnormal hemoglobins. SCD is the most common inherited condition worldwide.

Sickle cell disease (SCD) is associated with chronic hemolysis and painful episodes. The management of sickle-cell anemia in pregnancy can be complex. Painful crisis is the most frequent complication of SCD during pregnancy, with between 27% and 50% of women having a painful crisis during pregnancy, and it is the most frequent cause of hospital admission.

Pregnancy accelerates sickle cell complications, including acute anemia, acute pre-partum and postpartum vaso-occlusive crisis, pulmonary complications, preeclampsia or eclampsia, preterm delivery, antepartum admission and premature rupture of membranes. Fetal complications include preterm birth and its associated risks, intrauterine growth restriction, and a high rate of perinatal mortality. Few treatment strategies have shown widespread success in pregnancy outcomes.

Pregnant women with sickle cell disease (HbSS, HbSC and HbSβ Thal) may require blood transfusion to prevent severe anemia or to manage potential medical complications. Preventive blood transfusion in the absence of complications starting from the early weeks of pregnancy or blood transfusion only for medical or obstetric indications have been used as management policies.

**Methodology:**

Case Report

**Results/Findings:**

This case report describes two pregnancy outcomes for the same patient affected by sickle-cell anemia. She was managed by UPMC PinnacleHealth Maternal Fetal Medicine for both pregnancies. Her first pregnancy was not treated with prophylactic exchange transfusions as she was not compliant with the recommendation. This pregnancy resulted in a preterm delivery due to severe pre-eclampsia at 28 weeks gestation.

During her second pregnancy, she was compliant with the exchange transfusion protocol. This pregnancy resulted in a scheduled delivery at 36 weeks gestation without any evidence of pre-
eclampsia. Hemoglobinopathy studies were performed serially and hemoglobin A and S levels were closely followed as well as reticulocyte counts throughout her pregnancy.

**Conclusion:**

Sickle-cell anemia can have significant complications and consequences for patient care in pregnancy and may lead to a complex medical challenge for providers. Ideally women should be seen pre-conceptually for optimization of their SCD and partner screening. Antenatal care should include regular outpatient visits with regular monitoring for pre-eclampsia and of fetal growth.

Management strategies vary and serial prophylactic exchange transfusion is an accepted method of management. The patient in this case, in essence, serves as her own case control as she underwent one pregnancy without transfusion and another with transfusion.

The outcome differences in the pregnancies are significant for several reasons: the gestational age at delivery, the presence and absence of pre-eclampsia, fetal growth, maternal incidence of sickle-cell crisis and laboratory findings. The Society for Maternal Fetal Medicine has recently released a call for research regarding randomized control trials for prophylactic exchange transfusion in sickle-cell anemia.

This strategy shows promise as a treatment method for pregnant women suffering from sickle-cell anemia. A prospective, multicenter, randomized trial is needed to determine whether the potential benefits balance the risks of prophylactic transfusions.

**References:**

1. Hollie M. Reeves and Hong Hong, Transfusion Medicine in Obstetrics and Prenatal Patients, Clinical Principles of Transfusion Medicine, 10.1016/B978-0-323-54458-0.00011-8, (119-133), (2018).
Management of Left Anterior Descending Artery Dissection in Term Twin Gestation

Ayesha Hussain, DO, FACOOG

Spontaneous coronary artery dissection (SCAD) is a rare cause of acute coronary syndrome, particularly affecting fairly young otherwise healthy women and seen in women during pregnancy or in the puerperium. About 26 – 38% of cases occur in late pregnancy, peripartum or postpartum. The condition mainly involves left main stem or left anterior descending artery or both.

It has a high acute phase mortality. In a pregnant or postpartum woman, MI is a dramatic and potentially fatal presentation of SCAD, which remains poorly characterized. Spontaneous coronary artery dissection causes more than 40% of myocardial infarctions in pregnancy and the postpartum period. Increased awareness of this condition in obstetrics is crucial to ensure prompt diagnosis and therapy.

The etiology is uncertain. Hormonal changes during pregnancy, hemodynamic stress and changes in the autoimmune status have been considered possible etiological factors of arterial alterations, which may lead to new aneurysm formation and/or weakening of preexisting aneurysms.

The pregnant state induces elevated levels of progesterone and estrogen, which peak at term and then fall rapidly postpartum. The vascular endothelium, which has estrogen and progesterone receptors, is likely affected by these dramatic shifts. Estrogen can up-regulate vascular smooth muscle relaxation via release of nitric oxide and has been considered potentially cardioprotective; however, estrogen may also release matrix metalloproteinase, thereby degrading exovascular structural support.

The pregnant state has been considered a histological contributor to arterial degeneration including reticular fiber fragmentation, elastic fiber disorganization, hypertrophy, and hyperplasia of smooth muscle cells. These changes as well as the increased fragility of the coronary artery vasa vasora coupled with the extracellular fluid volume shifts of late pregnancy, labor, and delivery, and the early postpartum state may predispose vulnerable patients to SCAD.

Treatment differs from that of myocardial infarction as a result of atherosclerosis and the diagnosis should be considered in all parturient and postpartum patients with acute coronary syndrome. Complications of spontaneous coronary artery dissection include recurrence, congestive heart failure, and death. Thus, specialist obstetrician–gynecologists and maternal–fetal medicine specialists need to gain knowledge of spontaneous coronary artery dissection to improve outcomes.
Methodology:
Case Study

Results/Findings:
This case report describes a 37 year old patient with a term dichorionic diamniotic twin gestation that experienced Left Anterior Descending (LAD) coronary artery dissection and the management of this condition both during pregnancy and in the postpartum period.

Conclusion:
Myocardial infarction occurs in up to 1 in 16,000 pregnancies and up to 25 percent may be related to spontaneous coronary artery dissection. In the stable patient, conservative management is preferred, however, intervention is required in patients with ongoing ischemia, hemodynamic instability or left main coronary artery involvement.

In the stable patient, conservative management is preferred, however, intervention is required in patients with ongoing ischemia, hemodynamic instability or left main coronary artery involvement. This case, while unusual, presented a particular challenge in deciding on delivery due to her gestational age and the potential impact delivery could have on her cardiovascular function. The patient had ischemic changes with LAD involvement prior to treatment by Interventional Cardiology. She underwent percutaneous transluminal coronary angioplasty (PTCI) with seven drug-eluting stents placed in her LAD.

Delivery, by cesarean section, was decided upon for this particular patient due to her gestational age and multiple gestation with the input of several specialties including Ob/Gyn, Interventional Cardiology, Cardiothoracic Surgery and Maternal Fetal Medicine. After delivery, the patient was admitted to the Cardiothoracic ICU. Her postpartum care included balloon pump placement (and removal), uterine artery embolization, echocardiography, and subsequent rehabilitation. The patient was discharged home on post-operative day six with close follow-up with multiple providers.

The impact of pregnancy, including multiple gestation, on cardiovascular function in the absence of pathology is remarkable; the added complexity of myocardial infarction and coronary artery dissection added an element of uncertainty that required comprehensive, multi-faceted care.

A timely diagnosis and institution of appropriate treatment is important for a successful outcome. There is no consensus of opinion for optimal treatment. Conservative management, coronary artery bypass graft surgery, and percutaneous coronary intervention, all have been described in the literature as possible therapeutic options.

Clinicians need to be familiar with angiographic appearances of SCAD for prompt diagnosis and with management strategies to appropriately risk stratify, treat, and follow up these patients closely.

Spontaneous coronary artery dissection should be considered as a differential in any young woman presenting with chest pain associated with pregnancy.
References:


**Category:** Open

**Title:**
“Super-utilizers” of L&D triage do not have an increased postpartum EPDS

**Presenter:**
Sean Cronin, MD

**Objective:**
Obstetrical "Super-utilization" has been previously defined as > 4 acute/unscheduled medical visits during pregnancy. Non-pregnant patients over-utilizing emergency room resources have been reported to have higher rates of depression. Post-partum depression is a common condition, occurring in 1 of 8 pregnancies. A commonly used screening test used for postpartum depression is the Edinburgh Postnatal Depression Screen (EPDS). This is a validated questionnaire filled out prior to postpartum discharge. The level of response is tiered based upon the EPDS score. A score of > 11 triggers a nursing follow-up call after discharge. A response of > 14 triggers a psychiatry evaluation. We wished to determine if being a pregnant “Super-utilizer” could be a marker for postpartum depression.

**Methodology:**
The Einstein obstetrical database was searched to determine the number of acute/unscheduled L&D triage visits for patients delivering during a three-month time period. Patients with > 4 acute/unscheduled L&D triage visits were considered “Super-utilizers”. “Super-utilizers” were compared to controls who were consecutive delivering patients who had < 4 acute/unscheduled L&D triage visits and received their prenatal care at Einstein. An EPDS of 11 was considered a positive screen. Data were summarized, and groups were compared using chi-squared test for independence and Fisher’s exact test.

**Results/Findings:**
Of 750 delivered patients during a three-month period, 56 (7.5%) pregnant triage “Super-utilizers” were identified. The average EPDS scores were 3.5 and 2.14 in the “Super-utilizer” vs. the non- “Super-utilizer” groups, respectfully (p = 0.13). 3 (5.4%) of the 56 of “Super-utilizers” vs. 0 of 28 non- “Super-utilizer” had a positive EPDS (< 11) (p = 0.29). “Super-utilizers” were at increased risk of having an elevated EPDS score requiring intervention (< 11). This finding was both clinically and statistically significant.

**Conclusion:**
Pregnant triage “Super-utilizers” were not statistically more likely to have a higher Edinburgh Postnatal Depression Score (EPDS) than non-“Super-utilizers”. “Super-utilizers” were, however, more likely to have a positive EPDS score ( < 11) triggering an intervention for possible postpartum depression.
References:

**Category:** Open

**Title:**
Intrahepatic cholestasis of pregnancy and preeclampsia with severe features, a case series

**Presenter:**
Carissa Kulczycki, DO

**Objective:**
The first patient meeting criteria for this case series was a 21yo G3P2002. She presented for prenatal care in the early first trimester. She was dated by an LMP confirmed by early first trimester ultrasound. Pregnancy was uncomplicated up to presentation at 32 weeks. She presented to clinic at 32 weeks 3 days complaining of itching in her palms and soles. At that visit, she had an elevated blood pressure. She was sent to OB triage for PIH labs and total bile acids. It was at this time she was diagnosed with preeclampsia - based on blood pressure elevated >140/90 on two occasions more than four hours apart, and an elevated protein/creatinine ratio. She was admitted for observation and given a course of betamethasone. She denied symptoms of severe preeclampsia, including headache/vision changes/RUQ abd pain. Platelets were within normal limits. She did, however, have elevated liver enzymes. Bile acids were very elevated at 137µmol/L. At this time, she was not started on Magnesium sulfate, only observed. Blood pressures did not elevate in the severe range but were intermittently mildly elevated. She continued to deny symptoms of severe preeclampsia. Daily PIH labs were drawn. On HD#4, liver enzymes had continued to rise, despite treatment with ursodiol. At this point, ALT was 522, and AST 239. It was at this time that the on call MFM physician was contacted. The decision was made to proceed with induction of labor for worsening preeclampsia. She was started on Magnesium Sulfate, and induction of labor was carried out. She delivered a viable neonate via NSVD. Postpartum, she was continued on magnesium sulfate for 24 hours following delivery. Liver enzymes rapidly declined following delivery. Her symptoms of itching also rapidly resolved. Remainder of postpartum course was uncomplicated.

The second patient meeting criteria for this case series was a 20yo G1P0. She presented for prenatal care in the early first trimester. She was dated based on an LMP confirmed by early first trimester ultrasound. Pregnancy was uncomplicated prior to 28 weeks. At 28w0d, she presented complaining of itching on her palms and soles. Bile acids were elevated at 32µmol/L, ALT 377, AST 312. She was started on Ursodiol. Two week later, she presented with elevated blood pressures. At this time, she was also admitted for observation. PIH labs were drawn. P/C ratio was 0.2. Platelets were normal. Her liver enzymes had improved, with ALT 289, AST 183 The elevated liver enzymes were assumed to be due to ICP, as they continued to trend down throughout her hospital stay. She was discharged home after completing a course of betamethasone, as her blood pressure was stable in the mild range. At 31w1d, she presented to OB triage for elevated blood pressures. At this time, she had more than two elevated blood pressures in the severe range. Liver enzymes were elevated, with ALT 171, AST 103. She was diagnosed with severe preeclampsia at this time. She was started on magnesium sulfate. She was transferred to an outside facility for higher level NICU care, in the case that the severe preeclampsia acutely worsened. At 32w0d, the patient was transferred
back to our facility, as our hospital has NICU privileges starting at 32 weeks gestation. Her blood pressures had stabilized on Magnesium Sulfate. Patient remained inpatient, with daily CBC/CMP, with planned induction of labor at 34 weeks unless worsening s/sx. Blood pressures remained stable. At 34 weeks, she underwent induction of labor. She was started on magnesium sulfate at time of induction. She delivered a viable neonate via PLTCS for fetal intolerance to labor. Postpartum course was uncomplicated.

The third patient in our series was a 24yo G1P0. She presented for prenatal care early in her first trimester. She was dated by a 10-week ultrasound. Pregnancy was uncomplicated until 33 weeks when she presented with itching on her palms and soles. Total bile acids were 45µmol/L. ALT 38, ALT 30. She was started on Ursodiol. At this time, she also began to have mildly elevated blood pressures. She was admitted for observation and started on a course of betamethasone. She was discharged home after BP remained stable x24 hours. Her P/C ratio at this time was 0.24. At 34w1d, she presented for an NST, and was found to have elevated blood pressures in the severe range, and P/C ratio was 0.7, meeting criteria for severe preeclampsia. She was admitted to labor and delivery, started on magnesium sulfate, and induction of labor was carried out. Her liver enzymes and platelets remained within normal limits. She delivered a viable neonate via spontaneous vaginal delivery. Postpartum course was uncomplicated. The fourth patient in our series was a 25yo G2P1001. She presented for prenatal care in her second trimester and was dated by a 19-week ultrasound. Her pregnancy was complicated by hyperemesis gravidarum, for which she was hospitalized at 23 weeks at an outside facility. This patient had a long history of N/V, for which she had been followed by a GI specialist without a specific cause having been identified. At 29 weeks, she presented to labor and delivery complaining of itching on her hands and feet. Bile acids were drawn at that time and elevated at 26µmol/L. Liver enzymes at that time were mildly elevated, with ALT 73, AST 17. She was discharged home with ursodiol. About one week later, at 30w6d, she presented again to labor and delivery complaining of intractable N/V. At that time, her blood pressures were elevated in the 140s/100s. P/C ratio was 0.74. And here liver enzymes had increased to ALT 198, AST 164. She was diagnosed with severe preeclampsia, started on magnesium sulfate and transferred to an outside facility for higher level NICU care. She was subsequently stabilized and delivered at 34 weeks based on ACOG guidelines for severe preeclampsia. Postpartum course was reported as uncomplicated. Introduction and Background Intrahepatic Cholestasis of Pregnancy (ICP) is characterized by itching of the palms and soles, typically in the third trimester, with elevated total bile acids (TBA) and transaminitis (1, 2). It is relatively common, ranging from 0.4% to up to 15% of pregnancies in some populations (2). The incidence is increased in twin gestations, older maternal age, women with a normal BMI, and non-smokers (1, 2). ICP is diagnosed when total bile acids reach levels greater than 10, in the absence of other possible causes. It appears that the greater the elevation in bile acids, fetal and maternal outcomes become worse in severity, specifically with a total bile acid level greater than 40 µmol/L (1, 3). The proposed mechanism for ICP is thought to be due to changes in sex steroids, namely estrogen and progesterones (4). Estrogens act at tight junctions, which alters the sodium gradient through Na+/K+-ATPase activity, leading to lesser bile acid uptake in hepatocytes (1, 4). Genetics also play a role. Daughters or sisters of women with ICP are more likely to develop ICP during pregnancy. Geographical statistics are strikingly different (4). Abnormal progesterone metabolites may also attribute to ICP (4). The primary
concern for ICP in pregnancy has traditionally been adverse fetal outcomes. However, more recent data is trending toward fewer fetal complications that the original research proposed (2). Although, this trend may be due to active management, including early term delivery, of women diagnosed with ICP, as well as an increased awareness of the disease (2). Treatment for ICP is ursodeoxycholic acid (UDCA), which lowers the biochemical markers for ICP and improves pruritis (5).

**Methodology:**
Case Series

**Results/Findings:**
Adverse fetal outcomes include passage of meconium, fetal distress, spontaneous and induced preterm birth, and IUFD (1, 2). Maternal outcomes include GDM, preeclampsia, antepartum bleeding and placental complications, and emergent cesarean section. Shemer et al found that preeclampsia occurred in 6.7% of women with ICP, as opposed to 2.8% of women without ICP, in their study of over 1 million singleton deliveries. Raz et al also found a significantly increased incidence of preeclampsia in women of ICP, 7.4% incidence in women with ICP, as opposed to 1.5% of women without ICP. Treatment with UDCA with subsequent normalization of TBA, patients still developed preeclampsia (1). Preeclampsia most often occurred 2-4 weeks after the diagnosis of ICP, and its incidence was correlated with the severity of ICP on initial presentation. One analysis of over 56,000 pregnancies found that both maternal and neonatal outcomes were worse for patients with both preeclampsia and ICP, than for those whose pregnancy was complicated by only one of these disorders (6). Discussion These four cases of ICP and severe preeclampsia stood out for several reasons. One, they all occurred within a few months of each other. Two, all four patients required late preterm delivery, and prompted further consideration into our management. Thirdly was their relative young maternal age (mean age of 22.5 yrs). All other studies have described an increased incidence in older women (1, 2). This may be purely coincidence, or a result of overall younger maternal age among our population of pregnant women in our area. After reviewing the literature on this subject, it became clear that there are not any studies related specifically to severe preeclampsia and ICP. As stated above, preeclampsia appears to have an increased incidence when a patient also carries a diagnosis of ICP, but there have been no studies whether or not it is more common to have severe preeclampsia. At this time, we do not have enough patients fitting in this category to run a proper statistical analysis but may be able to do so in the future. How should patients with ICP and severe preeclampsia be monitored in the antenatal period? The literature on antepartum surveillance is not very strong in this area. Although ICP has not been shown to cause chronic fetal hypoxia, most still recommend antepartum testing at 34 weeks (4). Delivery is recommended at 36-38 weeks (2). All four patients in this series were all hospitalized when diagnosed with severe preeclampsia, per ACOG guidelines, and delivered at 34 weeks or sooner when indicated (ACOG). While in the observation period, these patients had daily PIH labs, then spaced out to every other day or longer if the labs had remained stable for three days. Initially they were placed on continuous fetal monitoring while being treated with magnesium sulfate. After initial stabilization of blood pressures and lab values, patients were then monitored with an NST every shift.
Should patients with ICP and preeclampsia be treated with UDCA? All four of our patients were treated with UDCA. The goal of treatment with UDCA is to reduce bile acids (2). Treatment is aimed at decreasing symptoms and decreasing transaminitis. It would seem logical that decreasing levels of total bile acids could help mitigate maternal and fetal risks associated with ICP. However, reducing biochemical markers of ICP does not decrease poor neonatal or maternal outcomes (1, 2, 5). However, it would reason that if UDCA decreases the level of elevated liver enzymes, perhaps fewer women with preeclampsia would meet diagnostic criteria for severe features of preeclampsia, and pregnancy may be allowed to continue to early term. For example, if a patient is less than 34 weeks, and meets criteria for severe preeclampsia based on elevated liver enzymes, perhaps a trial of UDCA, along with magnesium sulfate, could be undertaken. If the patient remains stable from a preeclampsia standpoint, and transaminitis resolves with UDCA, it may be reasonable to attribute the severe feature (transaminitis) to ICP, rather than preeclampsia. Perhaps in this scenario, the patient may be allowed to continue pregnancy until early term, when indicated induction of labor for ICP and preeclampsia may be carried out. Each case must be considered on an individual basis. Although a case report describing a woman with ICP who developed eclampsia (7) has been published, there is very little literature on women with ICP and severe preeclampsia. There are no current guidelines for management provided by ACOG. In our experience, and after consultation with the maternal fetal medicine specialist, we treated the more severe disease process with priority. For example, our first patient met criteria for severe preeclampsia based on elevated liver enzymes alone. It was impossible to delineate whether the transaminitis was due to ICP, or worsening preeclampsia. The more concerning issue would be worsening preeclampsia, so she was delivered after maximal steroid benefit. Conclusion Overall, these four cases showed that we should be watching closely for preeclampsia in patients who are diagnosed with ICP before term. We learned that diagnosis of preeclampsia carries challenges in management in the setting of ICP with elevated liver enzymes. However, several questions are left unanswered. Is ICP associated with an increased risk of severe preeclampsia? How should patients with ICP and severe preeclampsia be monitored in the antepartum period? Can transaminitis be distinguished as a result of ICP vs severe preeclampsia? Are patients with ICP and severe preeclampsia more like to develop eclampsia? Are neonates of mothers with ICP and severe preeclampsia at increased risk of poor outcomes? These are all areas where further research is needed to help guide management of patients.

References:


