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Untargeted Metabolomic Identification of Diagnostic Biomarkers in Ectopic Pregnancy

Onur Turkoglu

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35th Annual Junior Fellow Research Day



Michigan Section
American College of Obstetricians & Gynecologists



May 12, 2021
Virtual Assembly

A special “Thank You” is extended to our faculty abstract reviewers, judges, and section officers.

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The Michigan Junior Fellowship leadership is delighted to host research day and advocacy events throughout the year.

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Thank you to Dawn Fulks for her administrative expertise and assistance in planning our virtual program today!

2021 Michigan Section ACOG Junior Fellow Research Day Service Project



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I Support the Girls collects and distributes essential items, including bras, underwear, and menstrual hygiene products, allowing women experiencing homelessness, impoverishment, or distress to stand tall with dignity.



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PROGRAM

Annual Junior Fellow Research Day Michigan Section ACOG May 12, 2021

1:00 PM Welcome and Opening Remarks

Amy Whitten, M.D.
Junior Fellow Advisor, Michigan Section

Esther Chae, M.D.
Junior Fellow Chair, Michigan Section

Resident/Fellow Scientific Paper Presentations:

1:10 PM **High Recurrence Rate for Isolated Elevated MSAFP: Could it Help Predict Adverse Pregnancy Outcomes?**
Mariam Ayyash, M.D.
Henry Ford Health System

1:20 PM **Coronavirus Disease 2019 (COVID-19) in Pregnancy: A risk factor for hypertensive disorders of pregnancy? Analysis from a large metropolitan hospital system.**
Michael Baracy Jr.
Ascension St. John Hospital

1:30 PM **Utilization of Perinatal Palliative Care Service at Tertiary Care Hospital**
Mariam Diskina, M.D.
Sparrow Hospital, Michigan State University

1:40 PM **Nonspecific Polyp Findings in Endometrial Biopsies: What is the Clinical Significance?**
Amanda Elbin, M.D.
St. Joseph Mercy Ann Arbor

1:50 PM **#OBGYNInternChallenge: A Social Media-Based Educational Exploration for OBGYN Learners**
Elizabeth Southworth, M.D.
University of Michigan

2:00 PM **Optimization of postoperative opioid prescriptions in gynecologic oncology: striking a balance between opioid reduction and pain control.**
Alli M Straubhar, M.D.
University of Michigan

- 2:10 PM **Untargeted Metabolomic Identification of Diagnostic Biomarkers in Ectopic Pregnancy**
Onur Turkoglu, M.D.
Beaumont Health, Royal Oak
- 2:20 PM **Shock index as a tool for identifying patients at increased risk for postpartum hemorrhage during labor**
Cassandra Vogel, M.D.
Beaumont Health, Royal Oak
- 2:30 – 2:45 PM **Break**
Please leave zoom meeting on but make sure you are muted with camera off
- 2:45 – 3:30 PM **Keynote Speaker – Ahizechukwu Eke, MD, PhD, MPH**
17-alpha hydroxyprogesterone caproate for prevention of recurrent preterm birth
Johns Hopkins University School of Medicine
- 3:30 – 3:35 PM **Junior Fellow Research Day Service Project**
Amanda Elbin, M.D.
Junior Fellow Section Vice-Chair
- 3:35 – 3:40 PM **Section Update**
Esther Chae, M.D.
Junior Fellow Section Chair
- 3:40 – 3:45 PM **Advocacy Update**
Halley Crissman, M.D.
Junior Fellow Advocacy Chair
- 3:45 – 3:55 PM **Michigan AIM and Quality Improvement Opportunity**
Jody Jones, M.D.
District V Chair Elect
- 3:55 PM **Presentation of Research Awards**
Robert Starr, M.D.
Michigan-Section Chair
Amy Whitten, M.D.
Junior Fellow Advisor

ORAL PRESENTATIONS

ABSTRACTS

TITLE: High Recurrence Rate for Isolated Elevated MSAFP - Could it Help Predict Adverse Pregnancy Outcomes

AUTHORS: Mariam Ayyash¹, MD, MSCR, Madhurima Keerthy¹, MD, Jacquelyn Roberson², MD, Majid Shaman¹, MD

AFFILIATION: ¹Department of Obstetrics & Gynecology, Henry Ford Health System, ²Department of Genetics, Henry Ford Health System

Objective: Many studies describe the association between elevated isolated MSAFP values and adverse pregnancy outcomes. There is, however, paucity of literature regarding the rate of recurrence of isolated elevated MSAFP values and its associated pregnancy outcomes.

Methods: A retrospective cohort study was performed using data from pregnant multiparous women in Southeast Michigan from the year 1994 to 2020. Study subjects had at least one subsequent pregnancy with second trimester screening. Exclusion was made for any woman with pregnancies complicated by fetal anomalies, chromosomal abnormalities, or multiple gestations. The cutoff criteria for abnormal elevation in MSAFP was a value greater than or equal to 2.2 multiples of the median (MoM).

Results: A total of 99709 tests were performed between 1994 and 2020 with 2.8% having a raised MSAFP value. A total of 370 multiparous women had isolated elevated MSAFP values of which 27 (7.3%) had a recurrent elevated value in a subsequent pregnancy. In the recurrent pregnancy, 83% of women had abnormal placental pathology. When looking at individual outcomes, 73% of women with a normal initial pregnancy had a subsequent normal pregnancy and 62% with an abnormal initial pregnancy had a subsequent abnormal pregnancy. 60% of women with preterm labor in their initial pregnancy had subsequent preterm labor and 33% with demise or miscarriage in their initial pregnancy had subsequent recurrence.

Conclusion: Our study is the largest of its kind showing the high recurrence rate for isolated elevated MSAFP in a subsequent pregnancy and its impact on adverse pregnancy outcomes. We showed increased rates of IUGR, preeclampsia, fetal demise, preterm labor, and abnormal placental pathology in subsequent pregnancies with elevated isolated MSAFP values. We recommend highlighting such statistical values during preconception counseling for women with elevated MSAFP as it can assist with anticipating and predicting adverse pregnancy outcomes for future pregnancies.

TITLE: **Coronavirus Disease 2019 (COVID-19) in Pregnancy: A risk factor for hypertensive disorders of pregnancy? Analysis from a large metropolitan hospital system**

AUTHORS: Michael Baracy Jr.¹, MD*; Fareeza Afzal, MD; Susanna M. Szpunar¹, Ph.D; MaKenzie Tremp², MD; Karlee Grace³, DO; Marina Liovas⁴; Muhammad Faisal Aslam¹, MD

AFFILIATION: ¹Ascension St. John Hospital; ²Ascension Providence Hospital; ³Ascension Macomb-Oakland Hospital, ⁴St. Georges University

Objective: To evaluate the association of hypertensive disorders of pregnancy (gestational hypertension, preeclampsia, eclampsia) among pregnant patients that tested positive for Coronavirus Disease 2019 (COVID-19) infection during their pregnancy.

Methods: We conducted a retrospective cohort study of all pregnant patients who tested positive for COVID-19 at three participating hospitals located in a large metropolitan city and who delivered between February 1st and November 24th, 2020. Patients who tested positive for COVID-19 during their pregnancy and delivered (index cases) were matched to the three subsequent deliveries from patients who tested negative (controls) at the same institution. We evaluated the impact of COVID-19 on the development of a hypertensive disorder of pregnancy. We also evaluated trends in maternal characteristics, demographics, prior pregnancy complications, current pregnancy complications, COVID-19 severity, laboratory values and inflammatory markers, and maternal and fetal outcomes. Univariable analysis was conducted with Student's t-test, the chi-squared test and analysis of variance. Associations were analyzed using linear and logistic regression models.

Results: A total of 280 patients were included in the study: 70 patients who tested positive for COVID-19 and 210 matched controls. African American race and recreational drug use in pregnancy were risk factors for COVID-19 in pregnancy. Compared with pregnancies negative for SARS-CoV-2 infection, COVID-19 was associated with hypertensive disorders of pregnancy (OR 3.68, 95% CI 1.67 -8.10). When stratified by diagnosis, COVID-19 remained associated with an increased risk of gestational hypertension (2.9% vs 11.4%, p = 0.004) and preeclampsia (9.5% vs 21.4%, p = 0.009). There was no difference in route of delivery, preterm birth, intrauterine growth restriction, intrauterine fetal demise, or pregnancy and fetal outcomes.

Conclusion: Compared with pregnant patients who tested negative for COVID-19, patients that tested positive for COVID-19 during their pregnancy were at increased risk of having a hypertensive disorder of pregnancy.

TITLE: Utilization of Perinatal Palliative Care Service at Tertiary Care Hospital

AUTHORS: Mariam Diskina, MD; Anita Avery, MD; Matthew Allswede, MD

AFFILIATION: Sparrow Hospital, Michigan State University

Objective: To improve the utilization of perinatal palliative care (PPC) services at Sparrow, a university-affiliated community hospital. PPC provides systematic guidance and support to families of children diagnosed with profoundly life-altering conditions in the perinatal period. This study aims to characterize the drivers of consultation to PPC from obstetrician-gynecologists (OBGYNs).

Methods: An online survey was designed and distributed to Sparrow OBGYNs to assess: 1) Prior PPC exposure; 2) Understanding of consultation indications and timing, evaluated via hypothetical clinical scenarios; 3) Attitudes toward PPC, measured via Likert scale. Open-ended questions solicited additional input. Objective PPC consultation data were collected.

Results: 10 of 48 invitees responded (residents, attendings with 10+ years of experience). 50% had prior didactic PPC exposure. 50% knew how and have consulted PPC; all found it beneficial. Average confidence scores (out of 5) regarding knowledge of scope (2.9), indications for consultation (3.1) and its timing (3), with higher scores indicating greater confidence. There was a positive, non-statistically-significant, correlation between exposure to PPC and confidence scores. In hypothetical clinical scenarios, prompting increased the frequency of PPC consultation by 12% on average, with most impact on the genetic anomaly scenario. Participants most frequently chose 'diagnosis' as the time point at which to consult PPC.

PPC received 102 consults in 3.5 years since inception. Reasons include genetic syndromes, anatomic anomalies, prematurity, birth trauma, malignancy, and other life-limiting conditions. 26% were requested by OBGYN, the remainder by neonatology/pediatrics/unknown.

Conclusion: This study is the first attempt to formally assess PPC function at Sparrow Hospital. An overall positive response and understanding of PPC's contribution to the care of obstetric patients was demonstrated among OBGYNs. Data collection is ongoing. Developing didactics and building trigger criteria into the electronic medical record may increase utilization.

TITLE: Nonspecific Polyp Findings in Endometrial Biopsies: What is the Clinical Significance?

AUTHORS: Amanda Elbin, MD, Stephanie Skala, MD, Erika Mowers, MD

AFFILIATION: St. Joseph Mercy Ann Arbor

Objective: Nonspecific polyp findings such as “fragments of polyp” are common results in final pathology reports of endometrial biopsies. There are no guidelines for best management of these results. Our objectives were to determine the frequency of nonspecific polyp findings, evaluate how often further diagnostic procedures were performed and to calculate the incidence of clinically relevant polyps, hyperplasia and malignancy.

Methods: Retrospective chart review of all patients at St. Joseph Mercy Ann Arbor whose endometrial biopsies obtained between January 1, 2015 to December 31, 2019 had nonspecific polyp findings. The prevalence of clinically relevant polyps was determined by review of operative and pathology reports. Bivariate analysis and multivariate logistic regression models were used to identify clinical characteristics associated with further OR investigation, polyps and hyperplasia/malignancy.

Results: Nonspecific polyp findings were found in 10.3% (719/7073) of EMB pathology reports. Of these patients, 33.2% (239/719) underwent hysteroscopy or hysterectomy. Operative and pathology findings confirmed a clinically relevant polyp in 70.3% (168/239) of cases and 6.5% (11/168) had hyperplasia or malignancy. Postmenopausal women were more likely to have relevant polyp than pre or perimenopausal women (89.6% vs 42%, $p < 0.001$). Tamoxifen use was predictive of hyperplasia or malignancy, OR = 1.16 (95% CI 1.0-1.33, $p = 0.047$).

Conclusion: One third of patients with nonspecific EMB findings underwent definitive workup with hysteroscopy or hysterectomy. Clinically significant polyps were found in the majority of patients (70.2%) and a significant number were found to have hyperplasia or malignancy (6.5%). Menopausal status was predictive of clinically identifiable polyp, as was discrete endometrial polyp identification on initial EMB.

TITLE: #OBGYNInternChallenge: A Social Media-Based Educational Exploration for OBGYN Learners

AUTHORS: Elizabeth Southworth, MD, Sarah Santiago, MD Colin Russell, MD, MPH, Nicholas Raja, MD, Amanda Manorot, MD, Joseph White, MD, MS

AFFILIATION: University of Michigan, Department of OBGYN

Background: The COVID-19 pandemic has accentuated the importance of remote learning modalities. With widespread adoption of social media among the millennial generation, it is vital that medical educators harness these modalities for innovative curriculum design. Studies have demonstrated that social media is effective, accessible, and efficient for engaging medical learners.

Methods: Summaries for nineteen CREOGs Over Coffee podcasts were created. A summary was shared daily on Twitter using the hashtag, “#OBGYNInternChallenge”. Quiz questions could be included in each Tweet. Tweets were assessed using Twitter analytics for Impressions and Engagements. Impressions are the number of times a Tweet was seen on Twitter. Engagements are the number of times a Tweet was engaged with, including re-Tweets, likes, and comments.

Results: From June 1st-19th, 2020, 57 Tweets were posted from the authors’ six public Twitter profiles, reaching 57,299 Impressions and 5,927 Engagements. This included summary posts (31,841 Impressions, 4,052 Engagements), and 27 quiz questions (11,023 Impressions, 440 Engagements). As to not detract from the anti-racism resources shared on social media platforms, 11 medically relevant anti-racism Tweets were also shared (13,435 Impressions, 1,435 Engagements), linked to summary posts.

Discussion: These results demonstrate that Twitter can be used as an effective method for OBGYN medical education and widespread dissemination, with nearly 60,000 Tweet views over the duration of the Challenge. The authors, in collaboration with CREOGs Over Coffee Podcast creators, will be offering a more robust curriculum for this upcoming transition starting May 2021 which can be found at <https://www.obgyninternchallenge.com/>

TITLE: Optimization of postoperative opioid prescriptions in gynecologic oncology: striking a balance between opioid reduction and pain control.

AUTHORS: Alli M Straubhar MD, Liam Dalton, MS, Aimee Rolston MD MS, Kevin McCool MD PhD, Olivia De Bear PA-C, Cynthia Stroupe PA-C, R Kevin Reynolds MD, Karen Mclean MD PhD, Jean M Siedel DO. MS, Shitanshu Uppal MB;BS

AFFILIATION: Division of Gynecologic Oncology, Department of Obstetrics and Gynecology, University of Michigan,

Objective: The primary objective was to examine the impact of patient and procedural factors on acute postoperative opioid use and refill requests. The secondary objective was to use the data from primary objective analysis to develop a tailored opioid prescribing algorithm for gynecologic oncology patients.

Methods: Patients, age ≥ 18 years, undergoing a laparoscopic or laparotomy procedure for a suspected or known gynecologic malignancy between 3/2019- 9/2020 were included. Sociodemographic information, surgical details, and risk factors for opioid misuse (depression, anxiety, chronic pain, current opioid use, or substance abuse) were collected. Patients completed a postoperative questionnaire including opioid pill use and refills requests at 30 days postop (verified with automated prescription system). Patients were excluded if this questionnaire was not completed or if they received an opioid prescription other than Oxycodone 5mg tablets.

Results: Of the 566 patients identified, 94 patients (16.6%) did not complete the questionnaire and 82 patients (14.5%) received prescriptions other than Oxycodone 5mg, leaving 390 patients for final analysis. Thirty-nine percent (N=151) of patients reported not using opioids after discharge. Fourteen percent (N=52) of patients initiated a phone call with primary concern of pain and 5% (N=20) received an opioid refill.

For both minimally invasive procedures and laparotomy procedures, body mass index, comorbidities, intraoperative or postoperative complications and final diagnosis of malignancy were not associated with the amount of opioid consumption. However, younger age and history of risk factors for opioid misuse significantly impacted postoperative opioid use. In multivariate analysis, age ($p=0.038$) and risk factors ($p<0.001$) remained significant after controlling for other factors

Conclusion: Two out of every five patients did not use opioids after surgery. Younger patients and those with risk factors for opioid misuse need a tailored approach to prescribing opioids to balance the need for adequate pain control to the risk of misuse.

TITLE: Untargeted Metabolomic Identification of Diagnostic Biomarkers in Ectopic Pregnancy

AUTHORS: Onur Turkoglu, M.D¹, Stewart F Graham PhD², Robert Quinn PhD³, Ray Bahado-Singh, MD¹

AFFILIATION: ¹Department of Obstetrics and Gynecology, Beaumont Hospital, Royal Oak, MI

²Research Institute, Metabolomics Division, Beaumont Hospital, Royal Oak, MI

³Department of Chemistry, Michigan State University, Lansing, MI

Objective: Ectopic pregnancy (EP) is a potentially life-threatening condition and early diagnosis still remains a challenge, causing a delay in management leading to tubal rupture. Targeted metabolomics has been shown to identify novel biomarkers for the detection of ectopic pregnancy. Using untargeted metabolomics approach, we sought to identify putative plasma biomarkers for the detection of tubal EP compared to intrauterine pregnancies.

Methods: This case-control study included prospective recruitment of 50 tubal EP cases and 50 early intrauterine pregnancy controls. Plasma samples were biochemically profiled using tandem liquid chromatography-mass (MS/MS) spectrometry with untargeted metabolomics approach. To avoid over-fitting, datasets were randomly divided into a discovery group (30 cases vs 30 controls) and a test group (20 cases and 20 controls). Logistic regression models were developed in the discovery group and validated in the independent test group. Molecular networking and metabolite identification was employed using Global Natural Products Social Molecular Networking (GNPS) data base. Univariate and multivariate analysis were performed via MetaboAnalyst 5.0.

Results: In total 585 molecular features were identified. 46 metabolite concentrations were significantly altered in EP plasma ($p < 0.05$). Metabolomic profiling yielded significant separation between EP and controls ($p < 0.05$). Independent validation of a two-metabolite model consisting of D-erythro-sphingosine and oleoyl-carnitine, achieved an AUC (95% CI) = 0.962 (0.910-0.1) with a sensitivity of 100% and specificity of 95.9%. Molecular feature networking revealed significant alterations in glycerol phosphocholine pathway and depleted levels of sphingolipids.

Conclusion: We report novel untargeted metabolomic biomarkers with a high accuracy for the detection of EP for the first time. Accurate biomarkers could potentially result in improved early diagnosis and better understanding the metabolism of tubal EP cases.

TITLE: Shock index as a tool for identifying patients at increased risk for postpartum hemorrhage during labor

AUTHORS: Cassandra M. D. Vogel, M.D. (Resident); Ciara Talbot, M.D. (Fellow); M.D.; Zeynep Alpay-Savasan, M.D. (PI)

AFFILIATION: Beaumont Hospital, Royal Oak, MI

Objective: The predictability of postpartum hemorrhage (PPH). based on risk factors alone is very low. Previous studies in the obstetric population have suggested that there is a direct relationship between blood transfusion and an elevated shock index (SI), heart rate (HR) divided by systolic blood pressure (SBP). Our study aim is to determine the reliability of SI to predict postpartum hemorrhage during the labor process in a low risk patient population.

Methods: A retrospective case control study was designed for cases of PPH occurring between 2015 and 2019 at Beaumont Health – Royal Oak in full term singleton otherwise uncomplicated vaginal deliveries. Measurements of SI are taken in the latent phase of labor, in the active phase of labor, and in the second stage. Two methods were applied to develop the prediction model of PPH using logistic regression. In the first method, one of the SI measurements will be chosen as the single ‘best’ variable representing the predictor. The second approach makes use of the change between subsequent SI measurements as predictors (delta SI). Two methods were evaluated with respect to the model’s predictive quality, explained variance and the area under the curve (AUC).

Results: The HR, SBP, and SI each of the three labor related time points was not statistically different between the PPH group (n=32) and control group (n=17). The estimated AUC based on the ROC curve (95% confidence interval) for SI at admission, SI at active labor stage, and SI at delivery was equal to 52.0% (34.2% - 69.9%), 55.7% (37.6% - 73.8%), and 57.1% (40.0% - 74.1%), respectively. The change between SI measurements gave an AUC of 58.8% (40.7% - 77.0%).

Conclusion: Though the sample size in this study is small, the data suggest that SI at a single time point during labor is not a good predictor for increased PPH risk in low risk patients. However, the change in the SI over the labor course may hold some predictive potential. Continued investigation with a larger data is needed.

*ORIGINAL RESEARCH
POSTER PRESENTATIONS*

ABSTRACTS

TITLE: ISOLATED SECOND AND THIRD TRIMESTER ULTRASOUND FINDING OF SMALL HEAD CIRCUMFERENCE

AUTHORS: Esther Chae M.D.; Zeynep Alpay-Savasan M.D.

AFFILIATION: Beaumont Hospital Royal Oak, Department of Obstetrics and Gynecology

Objective: Head circumference is a routine parameter measured during prenatal ultrasound. Small head circumference (SHC) less than 10th percentile which does not meet the definition of microcephaly has not been studied and the data on clinical outcomes are unavailable. This study investigates the demographics of women and short term outcomes of infants with prenatal ultrasound findings of SHC.

Methods: We conducted a retrospective chart review of women who had fetal imaging ultrasound performed during second or third trimester of pregnancy for singletons at Beaumont Hospital locations in Royal Oak, Troy and Grosse Point from January 1 2015 to Dec 31 2016 with subsequent deliveries at any affiliated hospitals in Beaumont Health System. Fetal imaging reports including key words such as microcephaly or small head circumference were queried and head circumference less than 10th percentile were identified. Maternal demographics, pregnancy complications, neonatal outcomes and 5 year outcomes of infants were reviewed and descriptive analysis was performed.

Results: We evaluated records of 88 women and infants with prenatal findings of isolated SHC less than 10th percentile on second or third trimester ultrasound. The estimated rate of caesarean section was 38.6%. The estimated rate of NICU admission was 22.7% and 71.5% of infants were female. Two infants (2.27%) was referred to a pediatric neurologist and two infants (2.27%) were referred to pediatric speech specialist.

Conclusion: Counseling women about isolated finding of small head circumference on prenatal ultrasound presents a challenge for providers for its limited clinical significance. More research is needed to provide guidelines for counseling and antenatal surveillance of isolated small head circumference.

TITLE: The Utility of Antenatal Three-Dimensional Printing for Ex Utero Intrapartum Treatment (EXIT) Procedure.

AUTHORS: Jessica Garcia de Paredes MD^{1,2,4}, Jordan Gosnell MPH³; Michael Strug DO^{1,2,4}, Mili Thakur MD^{2,4,5}, Vivian C. Romero MD^{2,6}, Marcos Cordoba MD^{2,6}

AFFLIATION: Spectrum Health/Michigan State University OB/GYN Residency¹, Department of Obstetrics, Gynecology and Women's Health, Spectrum Health Medical Group², Helen DeVos Children's Hospital, Congenital Heart Center³, Department of Obstetrics, Gynecology and Reproductive Biology, Michigan State University College of Human Medicine⁴, Reproductive Genomics Program, The Fertility Center⁵, Division of Maternal Fetal Medicine, Department of Obstetrics, Gynecology and Women's Health, Spectrum Health Medical Group⁶

Objective: Routine antenatal ultrasonography (US) allows for the timely identification of fetal anomalies that can compromise the neonatal airway at delivery. Congenital airway obstruction may be secondary to multiple etiologies and poses life-threatening risks to the newborn. Securing the airway at the time of delivery can be challenging, given the disruption of the normal anatomy and limitations of conventional imaging modalities. We present two cases highlighting the novel utility of three-dimensional (3D) printing to plan for an ex-utero intrapartum treatment (EXIT) procedure.

Methods: 3D US volumes from the fetal face/neck were acquired, edited, and exported from VolusonTM E10 US System (GE Healthcare, Chicago, IL) in standard triangle language (STL) file format. 3-matic Medical (Materialise V, Leuven, Belgium) was utilized to prepare the imaging datasets for printing and included co-registration of multiple US volumes. The anatomic models were printed on F270 (Stratasys, Eden Prairie, MN; Case 1-immature cervical teratoma), and Form 3B (Formlabs, Somerville, MA; Case 2-oropharyngeal mass). Post-processing of models included removal of support materials, sanding, and color and clear spray coatings.

Results: The antenatal 3D-printed fetal physical models provided precise definition of the fetal anomaly and the impact on the airway. This allowed the multidisciplinary team to plan for the EXIT procedure prior to delivery. In addition, the models served as a tool for parental education and counseling of the fetal anomaly.

Conclusion: Accurate and early antenatal diagnosis improves the prognosis and outcomes following EXIT procedures in fetuses with congenital airway obstructions at the time of cesarean section. 3D printing plays an important role in the optimization of pre-surgical planning, prenatal parental counseling, and education of new medical professionals, and must be considered for fetuses with congenital airway obstructions

TITLE: **Significance of Fetal Perihepatic echogenic densities detected during routine antenatal ultrasound: A Case Series**

AUTHORS: Hota Tapaswini MD¹, Welch Robert MD²

AFFILIATION: ¹ Resident, Hurley Medical Center, Michigan State University. ² Division head, Division of Maternal Fetal Medicine, Hurley Medical Center, Michigan State University.

BACKGROUND: Peri-hepatic echogenic densities are an occasional sonographic mid- and last-trimester finding. This prenatal finding may be loosely associated with infectious, chromosomal or malignancy etiologies, although their true significance remains unknown¹. Bronshtein, et al² reported an incidence of 1 in 1750 ultrasounds between 15-26 weeks. They are as “bright as bone” persisting even when the imaging gain is low and without harmonic imaging. However, they occasionally cause acoustic shadowing in the same fashion as fetal bone. Their location related to the fetal liver may be parenchymal, peritoneal or vascular³. Although there is literature suggesting possible etiologies and are postulated to be different based on different locations, clinical significance remains uncertain.

CASE: The case series involves a retrospective study of 8 patients identified to have the incidental finding of perihepatic lesion during routine ultrasound surveillance. Study received IRB exempt status. 7 cases were parenchymal in nature, 1 being vascular. Prenatal tests including TORCH (positive in 3 cases) and karyotype was done which was normal in all cases. No association with IUGR found in any of the cases. Newborn course remained uncomplicated in 6 patients, with 1 lost to follow up and one had complications.

CONCLUSION: Single isolated intrahepatic calcification remains of unknown significance and may not require further follow up in absence of associated abnormal findings like stigmata of IUGR infection or aneuploidy.

TITLE: Physician Awareness of Risks of Cesarean Section

AUTHORS: Madeline M. Hulse, MD & Sharon S. Sung, MD

AFFLIATION: Sparrow Hospital/Michigan State University Obstetrics and Gynecology
Residency Program

OBJECTIVE: To assess the level of awareness obstetric providers at Sparrow Hospital have regarding various health fetal and maternal risks associated with cesarean delivery.

METHODS: Surveys were sent to all obstetric attendings and residents who deliver at Sparrow Hospital.

RESULTS: A total of 48 surveys were sent with 31.3% completed responses received. 70-95% of providers correctly identified maternal morbidity, mortality, uterine rupture, placenta previa, and placenta accrete as risks of cesarean section while less than 50% of responders correctly identified any of the childhood outcomes on the survey. Less than 20% of providers correctly identified other maternal risks of future miscarriage, ectopic pregnancy, decreased fertility, preterm birth, malpresentation, and low birth weight.

CONCLUSION: Obstetricians surveyed have a better understanding of maternal risks of cesarean section than potential fetal/childhood impacts. As a group, we need to increase our awareness of all potential risks in order to adequately counsel patients and obtain informed consent for all cesarean deliveries and in particular, elective cesarean deliveries without trial of labor.

TITLE: An Investigation of Baby Friendly Hospital Initiative and Postpartum Depression Rates

AUTHORS: Carolanne Kondos DO, Jennifer Caruso DO, Christina Andreozzi MD, Rachel Shamoun MD, Katherine Hartman MD, Monique Saleh MD, Ammanee Mohammad MD, Mukti Patel MD, Nuong Truong MD

AFFILIATION: Ascension Providence Hospital / Michigan State University College of Human Medicine, Department of Obstetrics and Gynecology

Objective: The Baby Friendly Hospital Initiative (BFHI) was implemented with the goal of increasing rates of breastfeeding among women as well as supporting early bonding between mother and baby. The purpose of this study was to evaluate the impact of the BFHI on the incidence of women developing postpartum depression. It was also designed in order to expose additional factors that correlate with rates of postpartum depression or breastfeeding.

Methods: A retrospective chart review from January 2013 through December 2017, including time before and after implementing the initiative, was performed and captured 535 patients that gave birth and attended their postpartum visits before and after the BFHI was adopted at Ascension Providence Hospital.

Results: Per the listed primary outcome, the results of the completed study lacked sufficient evidence to display a significant difference in the rates of postpartum depression before and after the implementation of the BFHI at Ascension Providence Hospital. However, a significant difference was seen in rates of postpartum depression in patients that were first time mothers (17%) and multiparous mothers (30%).

Conclusion: Further studies must be completed in order to conclusively comment on the effect of the BFHI on postpartum depression rates, however the BFHI did successfully increase the rates of breastfeeding and decrease the rates of bottle-feeding in delivering mothers.

TITLE: **Operational Constraints and Gender Biases: A Qualitative Analysis of Physician Parenting Experiences**

AUTHORS: Hsin Lee, MD¹, Heather Burrows, MD, PhD², Kanakadurga Singer, MD², Kirk J. Brower, MD³, Carol Bradford, MD⁴, Brooke Spencley, MD⁵, Lauren Owens, MD¹, Helen Kang Morgan, MD^{1&6}

AFFILIATION: ¹ University of Michigan Department of Obstetrics and Gynecology
² University of Michigan Department of Pediatrics
³ University of Michigan Department of Psychiatry
⁴ University of Michigan Department of Otolaryngology-Head and Neck Surgery
⁵ University of Wisconsin Department of Surgery
⁶ University of Michigan Department of Learning Health Sciences

Objective: Negative experiences with parenting are associated with poorer indices of physician well-being. Parenting responsibilities are also correlated with gender disparities in professional development and salary. The aims of this study were to (a) illuminate faculty physicians' experiences with parenting using qualitative analysis of free-text comments, and (b) identify systems challenges and opportunities for improvement.

Methods: In October 2019, a survey about parenting was sent to all physician faculty at a large Midwest academic medical center. The qualitative component derived from a single item that asked "is there anything you wish to share about your experience of pregnancy or parenting as a physician?" Themes were inductively identified and developed from the responses in a team-based iterative approach.

Results: Of 2069 total physician faculty, 1085 (52.4 %) responded and 253 (23%) of the respondents provided free-text comments. From these narratives, the authors identified operational constraints and gender biases that serve as current systems challenges for physician parents. Operational factors pertained to lack of scheduling flexibility, childcare challenges, lactation, colleague coverage, and transparency of policies. Responses indicated that gender biases are encountered by both women and men, and expectations built on assumptions of "traditional" gender roles and family structure are problematic for many physician parents.

Conclusion: Improving the experience of physician parenting requires active recognition of biases and assumptions and consideration of how our interactions, practices, and policies can be updated to be more appropriate and applicable to modern physician families. Addressing the challenges and opportunities identified in the study are critical to building a more supportive institutional culture around parenting and to increase gender parity in academic medicine.

TITLE: Comparison of Second Trimester Induction Protocols

AUTHORS: Anna R. McKenney, MD, Sharon S. Sung, MD

AFFLIATION: Sparrow Hospital, Michigan State University

Objective: There are many protocols in the literature for women who desire induction of labor in the second trimester, for intrauterine fetal demise or termination of pregnancy. The misoprostol/oxytocin regimen advocated by our local maternal fetal medicine specialist has not been studied, and no data exists regarding its efficacy in comparison to other regimens. The purpose of this study is to determine institutional outcomes of various second trimester induction regimens and to identify whether the local misoprostol/oxytocin protocol is non-inferior to more studied protocols.

Methods: A retrospective chart review was performed of patients who delivered at Sparrow Hospital from January 2014 through December 2020. Patients were included if they had inductions of labor from gestational ages 14w0d to 26w0d and did not desire resuscitation of their neonate. Patients were also excluded if they had surgical management (cesarean section or dilation and evacuation), or if they were under 18 years of age.

Results: A total of 171 patients met criteria for analysis. The two study groups had no statistical difference with regards to time to delivery, percentage of deliveries in under 12 hours, estimated blood loss, incidence of postpartum hemorrhage, incidence of infection from induction, or need for dilation and curettage for retained placenta. Patients who had their induction started as outpatients, prior to admission, did deliver significantly faster by an average of 3 hours ($p=0.0107$). Patients who had their inductions started outpatient also had significantly more women who delivered in less than 12 hours (74.6% versus 55.4%, $p=0.0138$).

Conclusion: The oxytocin/misoprostol regimen was statistically non-inferior to more studied induction regimens. Women who had their inductions started as an outpatient did deliver significantly faster after admission to the hospital.

TITLE: Pregnancy and Covid – a report of reassuring outcomes

AUTHORS: Farnoosh Qadri¹, Mirna Kaafarani², Federico G. Mariona³

AFFILIATION: ¹. Beaumont Health Dearborn
². Wayne State University School of Medicine
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Objective: To report the incidence, presentation, characteristics and short term perinatal outcomes of a cohort of hospitalized pregnant women who tested positive for SARS-CoV-2, causative organism of Coronavirus Disease-19 (2019-nCov, or Covid-19, ICD-10 U07.1).

Methods: The study group included pregnant women 18 and above, who were admitted to the hospital and tested positive for SARS-CoV-2 between March 26 and December 31, 2020. Universal testing via nasopharyngeal sampling followed by RT PCR and NAA determination was used during the study period. Neonates (NN) from mothers who were positive for CoVid-19 at the time of delivery were tested at age 24 and 48 hours for CoVid-19.

Results: 3109 pregnant women were hospitalized and tested during the study period. 148 (4.3%) were reported to be SARS-2 positive. 11.5% of the patients were symptomatic on admission, 76.4% had respiratory symptoms. 78.8% of the patients had a pre-existing condition with 61% being obese. One patient needed mechanical ventilation (0.6%). 88.4% of the patients were asymptomatic. 15.8% of the patients delivered preterm (<37 weeks). 4.3% of the neonates tested positive for SARS-2. There were no stillbirths or neonatal deaths in our cohort.

Conclusion: We report a pregnant patient cohort that experienced mild to moderate Covid-19 disease (as defined by SMFM) with re-assuring neonatal outcomes. An overwhelming majority of our patients did well. There have been varying reports about the severity of disease in pregnant women with earlier reports of severe manifestations associated with pregnancy. In view of the wide scope of clinical events and the variable severity reported in association with Covid-19 in pregnancy, we believe that future studies with strict assessment of risk factors, acuity and severity of the disease, along with timely reporting are required. Widespread collaborative efforts will assist in better understanding the effects of the novel SARS-CoV-2 virus in pregnant patients.

TITLE: Uterine Carcinosarcoma: Retrospective analysis of adjuvant radiotherapy treatment outcomes

AUTHORS: Alyssa Schloop, MD¹; Thomas Quinn, MD²; Cortney McKay, MD³; Sirisha Nandalur, MD²; Zaid Al-Wahab, MD⁴; Jayson Field, MD⁴; Jill Gadzinski, MD⁴; Joseph Anthony Rakowski, DO⁴; Barry Rosen, MD⁴; Maha Saada Jawad, MD²

AFFILIATION: ¹: Beaumont Health Department of Obstetrics and Gynecology
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Introduction: Uterine carcinosarcoma (CS), or malignant mixed Mullerian tumor, represents a rare and aggressive subtype of uterine cancer, accounting for less than 5% of all uterine malignancies. Compared to other types of uterine cancer, CS is more likely to present with metastatic disease and is overall associated with worse survival outcomes. Adjuvant radiotherapy (RT) has been shown to decrease the risk of local recurrence. We performed a retrospective analysis of patients with uterine carcinosarcoma treated at our institution to examine outcomes and toxicity profiles for patients treated with adjuvant RT.

Methods: We identified 24 patients with Stage I-III CS treated in a curative fashion at our institution from 2002 – 2009. All patients underwent surgical staging with either an open approach (n=11) or minimally invasive surgery with robotic assistance (n=13). Patient and tumor characteristics, treatment details, clinical outcomes, and toxicity data was collected for all patients. Clinical outcomes analyzed included local recurrence (LR), regional recurrence (RR), distant metastases (DM), disease-free survival (DFS), and overall survival (OS). GU, GI, and GYN toxicities were graded according to CTCAEv4.0. Time to event analysis was performed using the Kaplan-Meier method.

Results: Median follow-up time for our patient cohort was 2.7 years (1.5-5.8). Median age at diagnosis was 60 (56-64). Thirty two percent of patients had FIGO Stage I disease (n=8), 21% Stage II (n=5), and 46% Stage III (n=11). Following surgery, 83% of patients underwent adjuvant chemotherapy, the majority of patients received Carboplatin and Paclitaxel (75%). RT included pelvic RT alone in 6 patients (25%), intracavitary brachytherapy alone 9 patients (38%), or combined pelvic RT and intracavitary brachytherapy in 9 patients (38%). 2-year OS was 82.7% (95% CI, 68.6-99.7%), and 5-year OS was 69.1% (95% CI, 50.5-94.6%). Median survival time was 8.4 years from start of adjuvant RT. Overall, RT was well tolerated with low overall toxicity rates. The most commonly reported toxicities were grade 1-2: fatigue (27%), diarrhea (45%), rectal pain (23%), dysuria (32%), and vaginal discharge (23%). There were no grade 3-5 toxicities.

Conclusion: Adjuvant radiotherapy for CS with tri-modality therapy is associated with excellent clinical outcomes and is well-tolerated. Distant failure remained the most common treatment failure, an indication that there is a need for improved systemic therapy for these high risk patients.

| Clinical Outcome | 2-years | 5-years |
|-------------------------|---------|---------|
| Local Recurrence | 0% | 0% |
| Regional Recurrence | 8.3% | 12% |
| Distant Metastasis | 21% | 21% |
| Freedom from Recurrence | 79% | 66% |
| Disease Free Survival | 75% | 51% |
| Overall Survival | 83% | 69% |

TITLE: Efficacy of pilot program for obstructive sleep apnea screening in pregnancy.

AUTHORS: Nicolina Smith¹ DO/MBA/MS, Matthew Floyd DO², Roopina Sangha¹ MD/MPH, Philip Cheng² MD/MPH, Angela Osbourn², D'Angela S. Pitts³ MD, Luisa Bazan² MD,

AFFILIATION: ¹Henry Ford Health System Obstetrics and Gynecology, ² Henry Ford Health System Division of Sleep Medicine, ³ Henry Ford Health System Division of Maternal Fetal Medicine

Objective: Pregnant women with obstructive sleep apnea (OSA) are at higher risk for eclampsia, gestational diabetes, cardiomyopathy, congestive heart failure, and higher in-hospital mortality than pregnant women without OSA. OSA in pregnancy is underdiagnosed and opportunities for interventions are often missed. A screening pilot program was developed at an obstetrics clinic in an urban teaching facility to improve diagnosis of OSA among pregnant women.

Methods: New obstetric patients were screened for OSA by a nurse using a 6-question screening protocol that assessed for snoring/apneas, body mass index (BMI) > 35, essential hypertension, glucose disorders, neck size > 36 cm, and sleepiness. For patients who scored 2/6 or greater, a home sleep apnea test was ordered after discussing the risks of OSA and benefits of treatment with an obstetrician.

Results: In the 6 months before implementation of the OSA screening program, 0 women were referred to the Sleep Medicine clinic. Over 8 months of OSA screening, 571 women were screened and 124 (22%) were at high risk for OSA. Of the women who screened positive, 44 (35%) had OSA tests ordered. A total of 26 (57%) women performed portable sleep tests, and 16 (62%) were diagnosed with OSA with an apnea-hypopnea index ≥ 5 . Only 4 patients followed up in the sleep clinic after diagnosis, and only 3 patients met initial compliance with continuous positive airway pressure (CPAP) therapy.

Conclusion: A significant increase in screening for OSA was achieved after implementation of an in-clinic screening protocol for pregnant women. The high rate of OSA diagnosis via home sleep apnea tests points to the utility of the 6-question screening protocol. Although several patients screened positive, few underwent testing for OSA, and even fewer started CPAP and were compliant with therapy. This quality initiative program increased OSA detection rates; however, there is room for improvement for educating patients and helping them maintain OSA therapy.

TITLE: IMPACT OF LYMPHOVASCULAR SPACE INVASION ON ADJUVANT RADIATION TYPE FOR STAGE 1 ENDOMETRIAL CANCER AT BEAUMONT HOSPITAL: A PATTERNS OF CARE ANALYSIS

AUTHORS: Kathryn White, MD; Jessica Arden, MD, PhD; Kimberly Marvin, BS; Saada Jawad, MD*

AFFILIATION: William Beaumont Hospital - Royal Oak

Objective: Adjuvant radiation for early stage endometrial cancer patients may consist of vaginal brachytherapy alone (VBT) or pelvic external beam radiation (EBRT) with or without VBT. Clinical trials, including PORTEC 1 and 2, have identified patient and tumor characteristics to guide radiation recommendations. In May 2015, a subgroup analysis of the PORTEC studies identified substantial lymphovascular space invasion (LVSI) as a prognostic factor for pelvic regional recurrence, distant metastasis, and overall survival, and showed that only pelvic external beam radiation (EBRT) reduced the risk of regional recurrence. We hypothesized that the use of EBRT in stage I endometrial cancer patients increased at our institution since this publication. We performed a retrospective review of patterns of care at William Beaumont Hospital to determine whether EBRT was used more frequently than VBT for stage I patients after this publication.

Methods: We identified all stage 1 patients treated with radiation (EBRT, VBT, or both) from 2010 – 2020. Baseline patient and tumor characteristics were recorded. January 1, 2016 was used as a cutoff date. Univariate analysis (UVA) was performed to identify factors predictive of the use of EBRT.

Results: We identified 147 patients: 112 received VBT alone, while 35 received EBRT (22 EBRT alone, 13 EBRT with a VBT boost). Of these, 29% of patients treated with VBT alone and 60% treated with EBRT received treatment after January 2016 ($p = 0.001$). 60% of EBRT patients and 41% of VBT patients had LVSI ($p = 0.027$). 71% of EBRT patients and 89% of VBT patients underwent surgical lymph node evaluation ($p = 0.018$). There were no significant differences in age, grade, stage IA or IB, or adjuvant chemotherapy use between patients who received EBRT vs VBT. On UVA, LVSI was the only significant predictor of EBRT use (OR 2.07, $p = 0.045$). Receiving treatment prior to vs after January 2016 (OR 0.68, $p = 0.3$), grade (OR 1.23, $p = 0.2$), surgical nodal evaluation (OR 0.52, $p = 0.2$), stage IB vs IA (OR 1.99, $p = 0.051$), and adjuvant chemotherapy use (OR 1.04, $p = 0.5$) were not significant predictors.

Conclusion: While a greater percentage of patients who received EBRT were treated after January 2016, LVSI was the only significant predictor of EBRT use. This suggests that though receiving radiation treatment after publication of the PORTEC subset analysis was not independently predictive of EBRT use, this article may still have impacted recommendations for adjuvant radiation at our institution.

TITLE: Placenta Resident Education Project

AUTHORS: Joanne D'Souza, MD (Resident). Matthew Allswede, MD.

AFFILIATION: Sparrow Hospital/MSU Ob Gyn Residency

Objective: The pathological examination of the human placenta may yield useful clinical information for current and future pregnancies. The decision for pathologic exam is based on known maternal or fetal factors or abnormal findings on gross exam. Gross exam can provide information about retained products of conception and unanticipated findings. At our hospital, most deliveries are attended by Ob/Gyn residents who are not trained in performing a gross placental exam in a systematic way. No prior study has evaluated a resident's ability to examine a placenta.

This study's primary aim is to assess if an educational intervention can augment a resident's ability to perform a systematic and complete gross placental exam. A secondary aim is to evaluate knowledge of appropriate indications for pathologic exam.

Methods: An educational tool was designed for this study which provides a systematic approach to placental exam and identifies key components for evaluation. Residents complete a questionnaire regarding demographic factors and past training on examination. Residents then examine placentas and complete associated assessment forms. The educational intervention is administered. Residents then examine placentas and complete assessment forms. Prior to the second exam, one placenta is altered without the resident's knowledge. For a gold standard comparison, a histologist examines all the placentas and completes associated assessment forms. Data analysis compares pre- and post-test results and also compares to the gold standard result. Particular attention focuses on the successful identification of the altered component.

Results: The goal for participants in this study is 15. Data collection and analysis in progress.

Conclusion: This is a pilot study to evaluate the use of an educational tool in improving resident knowledge of placental abnormalities. A validation study with a larger sample size and including attending obstetricians will provide further insight into the value of structured training.

TITLE: Maternal and Fetal Outcomes after Increased Resident Supervision in a Teaching Hospital

AUTHORS: Danyelle O'Dell, MD; Sharon Sung, MD
AFFILIATION: Sparrow Hospital / Michigan State University

Objective: In January of 2020, Sparrow Hospital added night laborist coverage with the goals of improving resident supervision and patient outcomes. The goal of this quality improvement study was to investigate whether maternal and fetal outcomes indeed improve with increased resident supervision.

Methods: A retrospective chart review was performed for Normal Term Singleton Vertex (NTSV) cesarean section rate, overall cesarean section rate, 5- min Apgar <7 and NICU admission rates for all patients of Sparrow Women's Health or Ingham County Health Department from July-September 2019 as compared patients delivered after the introduction of night laborists from July-September 2020.

Results: NTSV Cesarean section rate 41.8% in 2019 and 43.1% in 2020; Overall cesarean section rate 40.3% 2019 and 45.4% in 2020; 5-Min Apgar <7 2.51% 2019 and 3.65% 2020; NICU admission 27.7% and 29.4% in 2020.

Conclusion: The introduction of increased supervision did not improve outcomes for mothers or babies at Sparrow Hospital. In fact, there was a trend for worsening outcomes. Specifically, the cesarean section rate increased before morning sign out.

Case Report Poster Presentations

ABSTRACTS

ABSTRACT #1

TITLE: **Partial Molar Pregnancy Presenting as a Tubal Ectopic Pregnancy: A Case Report**

AUTHORS: Mariam Ayyash, MD, MSCR, Monica Kole, MD, Quoc Le, MD, Monique Swain, MD

AFFILIATION: Department of Obstetrics & Gynecology, Henry Ford Health System

Background: Tubal molar pregnancy is extremely rare, with no more than 200 cases reported in the literature. The incidence is approximated at 1.5 per 1,000,000 pregnancies.

Case: We report the case of a 22-year-old woman with an overall benign initial presentation who was noted to have a ruptured ectopic pregnancy. She was surgically treated, and pathology revealed partial hydatidiform molar ectopic pregnancy. At the time of surgical intervention, the treating physicians had not considered molar ectopic pregnancy within the differential diagnosis, since this is a very rare presentation.

Conclusion: This case report highlights the importance of sending, reviewing, and following up on pathologic specimens for all patients undergoing surgical intervention for presumed ectopic pregnancy and ensuring that appropriate follow-up is in place for those patients.

ABSTRACT #2

TITLE: Acute Disseminated Encephalomyelitis (ADEM) in Third Trimester of Pregnancy: A Case Report and Review of Literature

AUTHORS: Jessica Garcia de Paredes MD^{1,2,3}, Michael Strug DO, PhD^{1,2,3}, Marcos Cordoba MD^{2,3,6}, Erin Fricke MD^{2,6}

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Department of Obstetrics, Gynecology and Women's Health, Spectrum Health Medical Group²
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Division of Maternal Fetal Medicine, Department of Obstetrics, Gynecology and Women's Health, Spectrum Health Medical Group⁴

Background: ADEM is an autoimmune demyelinating disease of the central nervous system. The relationship between the development of ADEM and pregnancy is unclear. Based on the literature review, only four cases have been described complicating pregnancy. To our knowledge, this is the first case reported in the setting of infection with the influenza A virus.

Case: Patient is a 22-year-old Gravida 1 Para 0 at 30 weeks and 2 days with an uncomplicated pregnancy who presented to the emergency department with fever, cough, and myalgias lasting 2 days. Initial workup was negative, including Influenza screening, and she was sent home. She had not gotten her influenza vaccine. Two days later, the patient was re-evaluated due to acute loss of consciousness and altered mental status.

Severe range blood pressure and elevated liver function tests prompted the work-up for preeclampsia. Physical exam showed bilateral clonus, and 3+ deep tendon reflexes. Urine protein creatinine ratio was 0.35. Nasopharyngeal swab was positive for influenza A. CT brain scan showed no abnormalities. Magnesium sulfate and antenatal steroids were administered, as well as antibiotics for suspicion of sepsis and oseltamivir.

Her mental status rapidly deteriorated requiring endotracheal intubation. MRI of the brain revealed diffuse T2 hyperintensity signals in the supratentorial white matter extending through the brain stem, bilateral temporal lobes, hippocampal area, and basal ganglia. Increased Intracranial pressures were refractory with subsequent tonsillar herniation and absence of brain stem reflexes. Given non-reassuring fetal status within 24 hours of maternal clinical brain death, cesarean section was performed without complications.

Conclusion: Most viral pathogens associated with ADEM can be prevented via timely immunization. Patient education/counseling about vaccination plays a vital role to prevent this fatal complication. Because of the lack of retrospective and prospective studies, the interaction between ADEM and pregnancy warrants further study.

ABSTRACT #3

TITLE: Surgical treatment of hepatic embryonal sarcoma with laparotomy in second trimester of pregnancy: a case report

AUTHORS: Katherine Holden DO¹, Caitlin Timmers MD¹, James Goodspeed MD², Silvia Linares MD¹

AFFILIATION: ¹Department of Obstetrics and Gynecology, Western Michigan University Homer Stryker MD School of Medicine, Kalamazoo, MI, USA ²Department of Maternal Fetal Medicine, Bronson Methodist Hospital, Kalamazoo, MI, USA.

Background: The need for surgery in pregnancy is not uncommon, with a prevalence of 1-2%. Research performed through case series reports, metaanalyses, and retrospective studies indicate that there is an increase in preterm birth and miscarriages for patients who undergo surgical procedures in pregnancy. Nevertheless, the American College of Obstetricians and Gynecologists states that a pregnant woman should not be denied necessary surgical care regardless of trimester. There have only been 4 published cases of hepatic sarcoma in pregnancy.

Case: A 34-year-old previously healthy G4P1021 at 14 weeks gestational age presented to the emergency department with complaint of low back and right upper quadrant abdominal pain. Physical exam was notable for enlarged liver with tenderness and guarding. MRI demonstrated a 16x15x20cm complex mass in the right lobe of the liver with associated hemorrhage and bulging of the liver capsule. Core biopsy of the lesion revealed hepatic embryonal sarcoma. At 15w5d, patient underwent open extended right hepatectomy with en bloc cholecystectomy. Hospital course complicated by vaginal bleeding both before and after laparotomy that continued for many weeks, eventually requiring re-admission at 23w4d gestation. She was diagnosed with chronic placental abruption, with eventual preterm labor and delivery of a viable female at 24w3d gestation.

Conclusion: A preterm delivery resulted for this patient whose pregnancy was complicated by persistent second trimester vaginal bleeding following liver resection via laparotomy for hepatic embryonal sarcoma. The etiology of the chronic placental abruption leading to the preterm delivery is unclear. Preterm delivery is a known risk factor of surgical procedures during pregnancy, however chronic placental abruption is not frequently associated with surgical intervention during pregnancy. Further research in this area may help to determine specific risk factors and associated mitigation strategies that may improve maternal and fetal outcomes.

ABSTRACT #4

TITLE: Case Report of the Successful Use of Two Skyla Levonogestrel Intrauterine Devices in a Patient with a Uterine Didelphys

AUTHORS: Kathleen O'Brien, MD; Colin Russell, MD; Frances Fei, MD; Monica Rosen, MD;

AFFILIATION: University of Michigan Department of Obstetrics and Gynecology

Background: Little is known about contraceptive desires in women with uterine anomalies. Only limited case reports exist regarding the use of intrauterine devices (IUD) in such patients. According to the United States Medical Eligibility Criteria (US MEC) for Contraceptive Use, any abnormally shaped uterine cavity, which includes congenital or acquired uterine abnormalities, are Category 4 for initiation of IUD contraception. We present the case of a young woman with uterine didelphys who desired IUD placement despite significant counseling of other contraceptive options.

Case: A twenty year-old nulligravida with a uterine didelphys desired contraception after failing oral contraceptive pills and an etonogestrel implant. Despite extensive counseling regarding Center for Disease Control and Prevention (CDC) guidelines regarding contraindications for IUD placement in the setting of a uterine anomaly, she desired to proceed with placement of two Skyla® (Bayer HealthCare, Whippany, NJ) levonorgestrel IUDs. She subsequently underwent an uncomplicated vaginal septum excision, placement of a single Skyla® IUD into each uterine horn, and removal of the etonogestrel implant. Ultrasound guidance was used throughout the case, and she tolerated the procedure well. Following IUD placement, she was doing well at her post-operative visit with only rare vaginal spotting. Both IUD strings were easily visualized on speculum exam.

Conclusion: In select patients with uterine anomalies, IUD placement may be a safe and effective option. The safe use of IUD in patients with uterine anomalies in this and other reports suggest that IUD use should be considered on a case-by-case basis and not contraindicated outright. This is especially important in adolescents who may be at increased risk for unintended pregnancy and poor obstetric outcomes.

ABSTRACT #5

TITLE: **Multidisciplinary Management and Operative Planning for a Pregnant Patient with Neurofibromatosis-1**

AUTHORS: Karina Pone, DO, Catriona Macardle, Pooja Green, MD,
AFFILIATION: St. Joseph Mercy, Ann Arbor

Background: Neurofibromatosis type 1 (NF-1) is an autosomal dominant disorder characterized by skin changes and neurofibroma growths in the peripheral and central nervous systems. NF-1 affected pregnancies may experience accelerated neurofibroma growth, complicated delivery, and adverse pregnancy outcomes including hypertension, fetal growth restriction and preterm delivery.

Cervical and spinal neurofibromas can lead to airway obstruction and complicate neuraxial anesthesia. Abdominopelvic neurofibromas may cause obstructed labor, inhibiting vaginal delivery.

Given the increased morbidity from NF-1 in pregnancy, a multidisciplinary team (MDT) should be utilized to optimize maternal and fetal health.

Case: A 28 year old G2P0010 with NF-1 required numerous inpatient admissions for conservative management of recurrent bowel obstructions secondary to abdominal neurofibromas. Prior to pregnancy, these obstructions were managed surgically. An MDT was formed consisting of Obstetrics, Anesthesia, and Colorectal Surgery (CRS).

An MRI abdomen/pelvis at 25 weeks gestation demonstrated an enlarging immobile pelvic neurofibroma, which was determined to impede vaginal delivery. Furthermore, innumerable spinal neurofibromas excluded her from neuraxial anesthesia. A Cesarean delivery with general anesthesia was planned for 39 weeks gestation. Due to her recurrent bowel obstructions, CRS counseled her for possible bowel resection.

The patient presented in preterm labor at 36 4/7 weeks gestation requiring urgent cesarean section. A 20 cm submandibular neurofibroma caused tracheal deviation, which prohibited intubation with ET tube. Thus an LMA was utilized for ventilation.

A midline laparotomy with a low transverse uterine incision was performed and the delivery was uncomplicated. CRS lysed multiple bowel adhesions relieving near complete obstruction. The pelvic mass was retroperitoneal and resection was unachievable. The remainder of her postpartum course was uncomplicated. The neonate appeared unaffected at discharge.

Conclusion: A patient with NF-1 should receive MDT care at a tertiary referral center. Preoperative planning for Cesarean delivery should include imaging to assess for feasibility for neuraxial anesthesia and additional surgical needs.

ABSTRACT #6

TITLE: Vessels Gone Wrong: A Rare case of Uterine Artery Pseudoaneurysm shunting in one postpartum patient

AUTHORS: Meher Raza DO, Nuong Truong MD, Michele Reinke-Young DO, Alan Newman MD

AFFILIATION: Department of Obstetrics and Gynecology at Ascension Providence Hospital/Michigan State University College of Human Medicine

Background: Postpartum hemorrhage represents 25% of maternal deaths worldwide and they can present as primary or secondary postpartum hemorrhage. Most often postpartum hemorrhage occurs due to uterine atony, retained placental fragments, lower genital tract tears or trauma, hematoma, coagulopathy, infection and involution of the placental bed. Secondary postpartum hemorrhage is less common and is postpartum hemorrhage after 24 hours from delivery up to 12 weeks postpartum. It may occur due to any previously listed causes, but may on rare occasions be due to vascular lesions, such as uterine artery pseudoaneurysm and arteriovenous malformations.

Case: 32 year old female patient G2P1011 presented on post-operative day 13 from an uncomplicated primary low-transverse cesarean section with significant vaginal bleeding. Transvaginal ultrasound and MRI identified a uterine artery pseudoaneurysm and the patient underwent CT guided embolization of the uterine artery. During the procedure, arteriovenous shunting was also identified. The patient's postoperative course was complicated by postembolization syndrome, however, with supportive care the patient recovered and was discharged home in stable condition.

Conclusion: Vascular lesions of the uterus such as uterine artery pseudoaneurysm and arteriovenous malformations are rare, but may be considered in the differential for postpartum hemorrhage. Uterine artery pseudoaneurysm and arteriovenous malformations are considered rare as there are limited reports in the literature. This suggests a need for further investigation in the incidence and implication of vascular lesions in the postpartum setting.

ABSTRACT #7

TITLE: Case Report: Arthrogyrosis multiplex congenita in pregnancy

AUTHORS: Mohammed R Said, MD (PGY-2 OBGYN resident)

AFFILIATION: Department of OBGYN, Hurley Medical Center/ Michigan State University College of Human Medicine, Flint, MI

Background: Arthrogyrosis multiplex congenita (AMC) is a disease characterized by multiple congenital joint contractures that affect two or more different areas of the body. The reported disease prevalence is 1 every 3000 live births; however, this prevalence varies widely in literature. Few cases of successful pregnancies in patients with AMC were reported in literature owing to decreased pulmonary reserve and higher risk of thromboembolism. We report a case of successful term pregnancy in a patient with AMC who delivered via cesarean section at term.

Case: A 26-year-old woman with clinical diagnosis of AMC who started her prenatal care with us at 17 weeks' gestation after spontaneous conception. She was mostly wheelchair bound; however, she was able to perform some tasks inside the house with limited mobility without using the wheelchair. She didn't have any family history of AMC and never had any orthopedic surgeries. No other cardiovascular or respiratory conditions were present. She tolerated the entire pregnancy without any cardiac or respiratory issues and all her prenatal tests results and fetal ultrasounds were unremarkable. Patient presented in latent labor at 37w5d gestation and cesarean section was performed without any complications under general anesthesia. A male newborn, weighing 2778 g and with an Apgar score 9 at 1 min. Postpartum period was uneventful, she was prescribed enoxaparin 40 IU daily for 6 weeks for thromboprophylaxis. The newborn had a normal physical examination at the time of birth, and during his follow-up visit.

Conclusion: Management of pregnant patients with AMC is challenging as information about managing these patients in literature is limited. Although some authors reported the need for preterm delivery because of severe respiratory discomfort, our patient had an unremarkable prenatal care and delivered via uncomplicated cesarean section at 37w5d gestation with an uneventful postnatal period.

ABSTRACT #8

TITLE: Intrapartum rupture of an unscarred uterus

AUTHORS: Sonia Sajja, MD, Caitlin Klaska, MD

AFFILIATION: Department of Obstetrics and Gynecology William Beaumont Hospital Royal Oak

Background: Rupture of an unscarred uterus is a rare event with an incidence of 4.5 per 100,000 cases and is associated with increased maternal and neonatal morbidity.

Case: A 41-year-old woman Gravida 3 Para 2 presented for an induction of labor for gestational hypertension at 40 weeks of gestation. Her obstetrical history is significant for a forceps-assisted vaginal delivery at 41 weeks and a spontaneous vaginal delivery at 40 weeks. She has a history of a loop electrosurgical excision procedure and no other surgical history. She underwent induction of labor with misoprostol, cervical Foley balloon, followed by oxytocin. Spontaneous rupture of membranes occurred, and an epidural was placed. After this, her fetal heart tracing was Category 2 with an increasing frequency of variable and late decelerations. She made rapid cervical change to complete. After fifteen minutes of pushing, the patient developed intense abdominal pain, fetal bradycardia, and loss of fetal station. We proceeded with emergent cesarean section that revealed a spontaneous uterine rupture in the anterior lower uterine segment and hemoperitoneum of 1.5 liters. The patient received 3 units of packed red blood cells and was discharged home on postoperative day 4. The arterial cord blood gases showed a pH of 6.8 with a base excess of -25. The neonate underwent a cooling protocol for moderate neonatal encephalopathy and was discharged home on day 7 of life without any evidence of seizures. At three months of age, the infant exhibited mild hypotonia without any significant neurologic deficits.

Conclusion: In this case, prompt recognition of intrapartum rupture of an unscarred uterus led to an expedited delivery and relatively decreased maternal and neonatal morbidity.

ABSTRACT #9

TITLE: Retroperitoneal Hematoma in Term Pregnant Patient Due to Angiomyolipoma: A Case Study

AUTHORS: Alissa L Small, MD; Hope Bauer, MD

AFFILIATION: Sparrow Hospital/MSU Ob/Gyn Residency (both authors are residents at this program)

Background: Women who are pregnant and present to care for a variety of symptoms are viewed differently in the eyes of a diagnostician, as pregnancy can impact the likelihood of particular etiologies. Being too quick to narrow one's differential, has the potential to lead to misses of rarer etiologies and sometimes severe non-obstetric disease processes. The following case will exemplify the importance of maintaining a broad differential diagnosis when approaching a term pregnant patient with abdominal pain and flank pain with recurrent late decelerations on fetal heart rate tracings.

Case: A 37 year old G3P0020 at 37 weeks 0 days presented to OB triage with chief complaint of left flank pain that awoke her from sleep. Her pregnancy was complicated by a history of cerebral vein thrombosis, which occurred years prior to this pregnancy, for which she was on prophylactic anticoagulation throughout pregnancy. On presentation, she was found to be hypotensive with recurrent late decelerations, so an urgent cesarean section was performed. Left kidney was palpated intra-operatively and suspected to be enlarged. Following surgery, the patient was persistently hypotensive and urgent CT imaging demonstrated 10cm left retroperitoneal hematoma. Interventional radiology performed successful embolization of a left angiomyolipoma.

Conclusion: In this case, fetal late decelerations were caused by acute blood loss from her retroperitoneal hematoma, diagnosed post-operatively. This patient had an undiagnosed angiomyolipoma and was on anticoagulation due to her medical history, which led to this complication. Broad differential and multidisciplinary approach were important factors in the favorable outcome for this patient.

ABSTRACT #10

TITLE: Growing Teratoma Syndrome and Gliomatosis Peritonei Associated with Immature Teratoma of Ovary

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Background: Gliomatosis peritonei (GP) is a rare condition characterized by mature glial implants throughout the peritoneum often associated with immature teratomas. Growing teratoma syndrome (GTS) is similarly a rare entity defined as a growing mass during or after chemotherapy for germ cell tumors. We present a case of a patient with stage IIIC immature teratoma of the ovary with gliomatosis peritonei at presentation who subsequently developed widely metastatic peritoneal growing teratoma syndrome during the course of her treatment.

Case Study: A 29 year-old G0 female presented with bloating and shortness of breath. On CT imaging, the patient was found to have a large 20 cm complex pelvic mass containing fat and calcifications scattered throughout the central portion. There was massive ascites and multiple peritoneal densities suggestive of metastatic disease. Tumor markers revealed an elevated alpha fetoprotein (AFP) 499 ng/ml, Beta-hcg 6 mIU/ml, CA-125 336 U/ml. The patient underwent an exploratory laparotomy, removal of the pelvic mass, left salpingo-oophorectomy, surgical staging and debulking. The patient was diagnosed with Stage IIIC, Grade 3 immature teratoma of the ovary with immature teratoma involving left ovary and fallopian tube, numerous peritoneal nodules, diaphragm nodules, omentum as well as left para-aortic lymph nodes. Gliomatosis peritonei was also found on omental tissue. She was treated with three cycles of chemotherapy with bleomycin, etoposide and cisplatin. During her chemotherapy treatments, repeat CT imaging revealed large 15 cm pelvic mass with numerous peritoneal masses with decreasing AFP. The patient underwent a second surgery for debulking. Pathology revealed teratoma composed of only mature elements including mature neural tissue in all resected specimens consistent with growing teratoma syndrome.

Conclusion: Our case highlights the rare findings of GP as well as diffuse peritoneal GTS in a patient with advanced stage immature teratoma. GTS and GP are both associated with benign peritoneal glial implants.

ABSTRACT #11

TITLE: **Multicystic peritoneal mesothelioma (MCPM), a rare cause of pelvic pain in a reproductive female: A case report and literature review**

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Multicystic peritoneal mesothelioma (MCPM) is a rare and benign neoplasm affecting the peritoneum of reproductive age females. The etiology may be a neoplastic process or a reactive process causing inflammation in the peritoneum. As of 2018, there have been approximately 200 cases reported¹. There is limited data on progression and treatment of this condition. Some authors suggest that due to this malignant potential, etiology of MCPM is likely a neoplastic process that resembles that of a borderline neoplasm². Due to the rarity of this condition, treatment is not standardized. However, resection (cytoreduction CRS) is the current mainstay of treatment. The case we report is a reproductive age female who presented with chronic pelvic pain, long-standing bladder symptoms and no significant history. The patient's clinical picture, laboratory and imaging results could not definitively diagnose the etiology of her pain. However, MRI imaging suggested identity of lesions to be peritoneal inclusion cysts. The patient underwent a robotic assisted resection of the lesions, peritoneal stripping of bladder and lower abdominal wall, and appendectomy. Based on resulting surgical pathology, the patient was diagnosed with MCPM.

1 Noiret, B., Renaud, F., Piessen, G. & Eveno, C. Multicystic peritoneal mesothelioma: a systematic review of the literature. *Pleura Peritoneum* **4**, (2019).

2 Zhang, C.-H., Yu, J.-W. & Luo, M. Multicystic peritoneal mesothelioma: A short review. *Curr. Probl. Cancer* **41**, 340–348 (2017).

ABSTRACT #12

TITLE: Postpartum Bilateral Lung Transplantation in COVID-19 Associated Respiratory Failure

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Background: As of March 2021, there have been 30.3 million cases of the coronavirus 2019 (COVID-19) infection in the United States, with more than 549,000 deaths. Of patients with COVID-19 infection, 5% become critically ill, and in these patients, the mortality rate is over 50%. Extracorporeal membrane oxygenation (ECMO) has been used for critically ill patients with respiratory failure in COVID-19 infection refractory to invasive mechanical ventilation.

Case: This case report describes a 31-year old female at 35 weeks gestation who was admitted with mild COVID-19 disease. Her condition progressively worsened following delivery, requiring intubation, maximum ventilatory support, and subsequently ECMO. Based on the severe and irreversible nature of her lung disease, she ultimately met criteria for and underwent bilateral lung transplantation.

Conclusion: This case showcases the use of lung transplantation as an alternative life-saving option for severe COVID-19 respiratory failure refractory to ECMO and mechanical ventilation. Further studies are needed to develop a multidisciplinary approach for patient selection for transplantation in the setting of COVID-19 infection and to assess long term outcomes.

ABSTRACT #13

TITLE: Recurrent Orgasms – Case of temporal lobe epilepsy with a orgasmic aura

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Background: Temporal lobe epilepsy has a known history of somatosensory auras, most interestingly of which include orgasmic and genital auras. Orgasmic auras are most often described as a pleasurable sensation and can be accompanied by physical responses such as increased vaginal secretions. Genital auras often present as painful vulvovaginal sensation. It is assumed that the neurologic pathways contributing to these auras are identical to physiologic orgasms.

Case Study: We present a case of a 69 year-old G1P0010 female with the chief complaint of recurrent orgasms for greater than one year duration. The patient describes a fullness sensation associated with the sensation of penetration within her vagina and rectum. She also admits to recurrent unprovoked orgasms occurring every few minutes. On physical exam the patient appeared uncomfortable frequently changing positions in bed with periodic brief episodes where she appears dazed, distracted, with her head subtly tilted to the left. Following each episode the patient appeared somnolent for 1 to 2 minutes. The pelvic examination was severely limited due to patient discomfort and positioning. An MRI of the brain performed 4 month prior revealed a left sided temporal lobe lesion measuring 6.7mm in size. The patient underwent a 3-day EEG which showed mild generalized slowing, however, no discrete seizures or specific epileptiform discharges noted. The patient was prescribed an empiric trial of Lamotrigine.

Conclusion: There are a limited number of case reports documenting this patient presentation. However, it is believed that many more actually exist undocumented, as the symptoms are often not revealed due to fear of criticism and shame. The purpose of this case report is to shed light on a topic that is unfamiliar, complex and otherwise considered taboo by both patients and providers.

NOTES