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GYNAE SPECTRUM



Dear Doctor,
Greetings from Micro Labs. We are happy to bring you “**Gynae Spectrum Newsletter**”, which contains latest and interesting news in the field of Obstetrics and Gynecology.

This issue contains:

1. Evaluation of Patterns of Health Care Utilization among Patients with Chronic Pelvic Pain
2. Prediction of Pregnancy Complications After Assisted Reproductive Technology Using Ultrasonographic Placental Parameters at 11-13+6 Weeks Gestation
3. Incidence of neonatal jaundice among Glucose-6-phosphate dehydrogenase-deficient neonates and its association with various risk factors
4. Case Report on Intestinal Perforation during Third Trimester in Pregnant Woman

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Looking forward to your valuable feedback.
Best Regards,
Medical Team, Micro Labs Limited

Evaluation of Patterns of Health Care Utilization among Patients with Chronic Pelvic Pain

Introduction

Female chronic pelvic pain is defined as a recurrent or constant pain in the lower abdomen or pelvic area lasting at least 3–6 months. It affects 10% to 20% of people born with a uterus in the United States and often results in functional and psychological disability, significantly impacting quality of life.¹ It is as common as migraine and asthma and is estimated to be responsible for 20% of gynaecological consultations yet, relatively few studies have been done on the topic, and doctors often describe it as difficult to manage.² Health care utilization for chronic pelvic pain patients is higher than for those without it, leading to increased physician visits, hospital admissions, and diagnostic imaging.¹ Hence, this study aimed to describe the utilization patterns of health care services among patients with chronic pelvic pain and also compared the utilization pattern of patients with chronic pelvic pain that differs from the general population and its economic effect was carried out between patients with chronic pelvic pain and a matched control cohort.



Methods

The study used de-identified administrative claims data from the Optum Labs Data Warehouse. Female patients aged 18 or older with their first medical claim for chronic pelvic pain were included. Chronic pelvic pain was identified using ICD-10 diagnosis codes R10.2, G89.29, and G89.4. Diagnostic procedures included pelvic computed tomography (CT) scan, pelvic magnetic resonance imaging, pelvic ultrasonography, cystoscopy and colonoscopy, and infection screening for urinary tract infection, as well as chlamydia and gonorrhoea screening. A control cohort without chronic pelvic pain was matched based on sociodemographic characteristics, health plan enrollment, year of index diagnosis, and comorbidities. The study analyzed chronic overlapping pain conditions, diagnostic tests, physician services, interventions, and average health care costs in the year following the initial diagnosis. Comparisons between those with and those without chronic pelvic pain using chi-square tests for categorical data and Wilcoxon rank-sum tests for continuous data.

Results

The study cohort included 18,400 patients with chronic pelvic pain and an equal number of matched controls. Patients with chronic pelvic pain had higher rates of chronic overlapping pain conditions such as chronic low back pain (39.7%), migraine (10.7%), and fibromyalgia (9%). They also utilized more health care services, including office visits, ED visits, hospitalizations, diagnostic tests, and medications. The average annual health care cost per

patient with chronic pelvic pain was \$12,254. Diagnostic testing was frequent, with urine culture (42.4%), followed by pelvic ultrasonography (32.8%) and pelvic CT (26.3%) being the most common. Chronic pelvic pain patients had higher rates of hysterectomy (8.9% vs 0.6%) during follow-up, and laparoscopic fulguration of endometriosis was coded in 5.9% of patients. One-third of the patients (35.3%) who had chronic pelvic pain made at least one physical therapy (PT) visit, while 10.9% utilized 10 or more PT visits (Figure 1). Among the interventions, physical therapy was most often used. Peripheral nerve blocks came in second most frequently (16.6%). Overall interventions were more utilized by patients with chronic pelvic pain. During follow-up, the majority of patients (55.5%) with chronic pelvic pain had 10 or more office visits. For both cohorts, internal medicine and family practice were the most frequently used specialties. Patients who experienced chronic pelvic pain visited the emergency department (ED) more frequently. In those with Chronic pelvic pain, opiates were used more frequently (24.7% vs. 7.3%, $P < 0.001$).

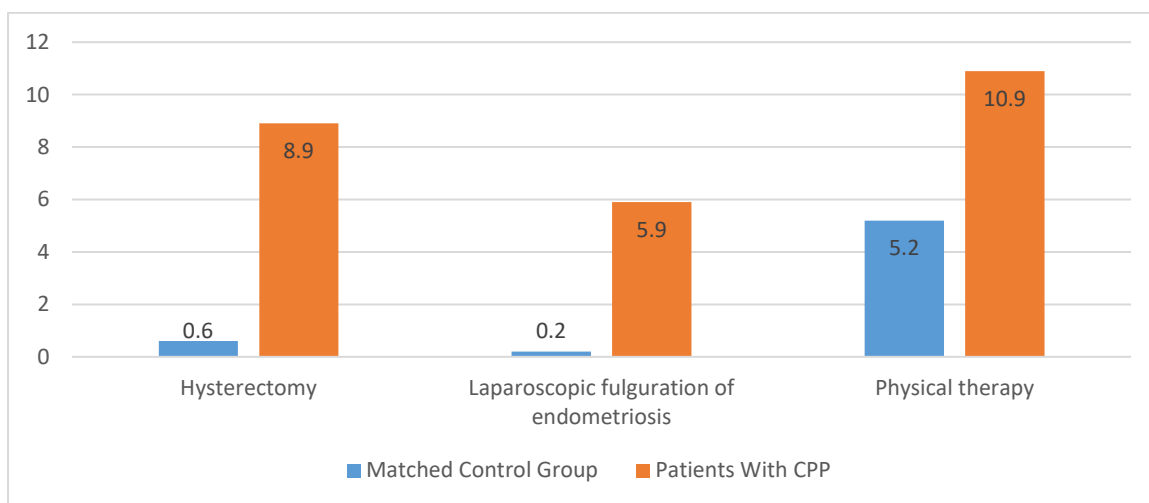


Figure 1. Diagnostic test and intervention data between both cohort group

Discussion

Patients with chronic pelvic pain exhibit higher health care utilization and costs compared to those without the condition. This includes more frequent use of diagnostic tests, procedures, and interventions such as opiates and physical therapy. The study highlights potential areas for improvement in managing chronic pelvic pain, including addressing the psychological components of pain, optimizing diagnostic testing, and reducing reliance on ED visits and opioids. During the study period, the cohort of patients with chronic pelvic pain had a higher rate of hysterectomy (8.9% vs 0.6%) than the control group.¹ According to recent research evaluating the effectiveness of hysterectomy in treating chronic pelvic pain, up to 11% of individuals still have pelvic pain after six months following surgery.³ The high rate of hysterectomy suggested a need for better surgical decision-making and consideration of non-surgical treatment options.

Conclusion

Patients with chronic pelvic pain demonstrating a significant economic burden and higher rates of overlapping chronic pain conditions and underwent more ED visits, imaging tests, and



hysterectomies than patients without chronic pelvic pain. Targeting interventions such as physical therapy and psychological support could help address the gaps in current care practices and enhance the quality of life for patients with chronic pelvic pain.

References

1. Green I, Briggs M, Encalada Soto D, Cole K et al. Health Care Utilization by Patients With Chronic Pelvic Pain. *Obstet Gynecol.* 2024 Jul 1;144(1):4-11.
2. Vincent K, Evans E. An update on the management of chronic pelvic pain in women. *Anaesthesia.* 2021 Apr;76 Suppl 4:96-107.
3. As-Sanie S, Till SR, Schrepf AD, Griffith KC et al. Incidence and predictors of persistent pelvic pain following hysterectomy in women with chronic pelvic pain. *Am J Obstet Gynecol.* 2021 Nov;225(5):568.e1-568.e11.

Utilization of Physical therapy and psychological or behavioral therapy, and reducing ED utilization help reduce overall health care costs and improve patient care.

Prediction of Pregnancy Complications After Assisted Reproductive Technology Using Ultrasonographic Placental Parameters at 11-13+6 Weeks Gestation

Introduction

Gestational diabetes mellitus (GDM) is defined as a condition of hyperglycemia (fasting plasma glucose ≥ 5.1 mmol/L, 1 h ≥ 10 mmol/L, 2 h ≥ 8.5 mmol/L during a 75 g oral glucose tolerance test according to IADPSG/WHO criteria) that was diagnosed during pregnancy.¹ Gestational diabetes mellitus (GDM) and pre-eclampsia (PE) are common pregnancy complications leading to adverse maternal and neonatal outcomes. Approximately 7-10% of pregnancies are affected by GDM, while 2-5% are complicated by PE. The incidence of pregnancies conceived via assisted reproductive technology (ART) has increased globally, and studies indicate that ART was associated with a higher risk of pregnancy complications, including a 1.53-fold increase in GDM and a 1.71-fold increase in PE. Therefore, early prediction and prevention strategies are essential to improve outcomes for GDM and Great obstetrical syndromes (GOS).² This study aimed to evaluate the performance of maternal factors, biophysical and biochemical markers at 11-13 + 6 weeks' gestation in the prediction of gestational diabetes mellitus with or without large for gestational age (GDM $\pm$

Flow index and Maternal mean arterial pressure were independent predictors for gestational diabetes mellitus with or without large for gestational age fetuses and great obstetrical syndromes

LGA) fetus and GOS among singleton pregnancy following in-vitro fertilisation (IVF)/embryo transfer (ET).

Methods

This was a prospective observational study conducted on women who conceived via IVF/ET with a single viable fetus confirmed by ultrasound at 11-13 + 6 weeks' gestation. Gestational age (GA) was calculated based on the date of embryo transfer. Maternal demographic characteristics, infertility history, and ART treatment details were recorded. At the 11-13 + 6 weeks' gestation visit, mean arterial pressure (MAP) was measured, and transabdominal ultrasound scans were performed to assess various parameters, including crown-rump length (CRL), mean uterine artery pulsatility index (mUtPI), placental volume, and vascular indices (VI, FI, and VFI). Blood samples were collected to measure serum placental growth factor (PlGF) and soluble fms-like tyrosine kinase-1 (sFlt-1) concentrations. Primary outcomes were GDM $\pm$ LGA fetus and great obstetrical syndromes (GOS), which included PE, gestational hypertension, spontaneous preterm delivery (sPTB), small-for-gestational-age (SGA) neonates, and intrauterine fetal death. Multivariate linear regression analysis determined significant predictors of biomarkers in uncomplicated pregnancies, while logistic regression analysis was used to identify predictors of GDM $\pm$ LGA fetus and GOS.

Results

A total of 145 pregnancies were included in the final analysis, with 38 cases (30.9%) of GDM $\pm$ LGA fetus and 28 cases (22.8%) of GOS. Maternal demographics and clinical characteristics indicated that women with GDM $\pm$ LGA fetus had significantly higher body height and BMI compared to those with uncomplicated pregnancies. When comparing the GOS group to the uncomplicated pregnancy group, there was a significant increase in MAP ($p = 0.026$). In the GOS group, there was a significant negative relationship between mUtPI and sqrt VFI ($r = -0.404$, $p = 0.033$). In the GDM $\pm$ LGA fetus group, Placental growth factor (PlGF) showed a significant positive connection with log10 placental volume ($r = 0.323$, $p = 0.048$) and FI ($r = 0.381$, $p = 0.018$). Flow index (FI) was an independent predictor of GDM $\pm$ LGA fetus, and mean arterial pressure (MAP) was a significant predictor for GOS. Significant correlations were observed between biomarkers and ultrasonographic placental parameters in both the GDM $\pm$ LGA fetus and GOS groups. For the prediction of GDM $\pm$ LGA fetus, the AUROC was 0.610 ($p = 0.062$) (Figure 1), whereas for the prediction of GOS, the AUROC was 0.645 ($p = 0.026$).

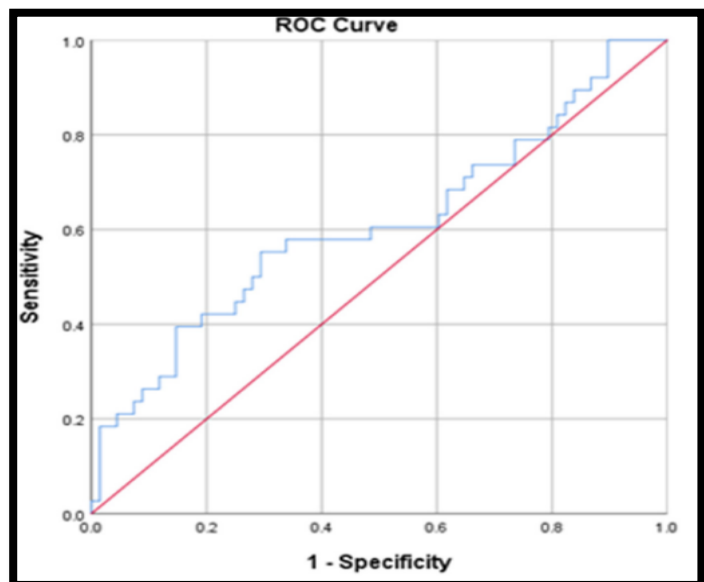


Figure 1. Receive operator curve to predict gestational diabetes with or without large for gestational age (GDM $\pm$ LGA) fetus.



Discussion

This study demonstrated that maternal height and BMI were higher in pregnancies that develop GDM $\pm$ LGA fetus. FI and MAP were significant independent predictors for GDM $\pm$ LGA fetus and GOS, respectively. Significant correlations between biomarkers and placental parameters support the potential of these measures in predicting pregnancy complications in IVF/ET pregnancies.² Previous studies have reported that women who conceived with ART have increased risk of pregnancy complications with 1.53 and 1.71-fold increase in the risk of GDM and PE, respectively.³ These findings contribute to the growing evidence that early prediction models incorporating biophysical and biochemical markers can improve the management and outcomes of high-risk pregnancies.²

Conclusion

Maternal BMI emerged as a notable risk factor for GDM $\pm$ LGA fetuses. FI and MAP were significant independent predictors for GDM $\pm$ LGA fetuses and GOS, respectively. The correlations found between biomarkers and placental parameters offer deeper insights into the interactions leading to these complications, highlighting the need for further research to validate these markers and improve predictive models.

Reference

1. Modzelewski R, Stefanowicz-Rutkowska MM, Matuszewski W, Bandurska-Stankiewicz EM. Gestational Diabetes Mellitus-Recent Literature Review. *J Clin Med*. 2022 Sep 28;11(19):5736.
2. Ip PNP, Nguyen-Hoang L, Chaemsaitong P, Guo J et al. Ultrasonographic placental parameters at 11-13+6 weeks' gestation in the prediction of complications in pregnancy after assisted reproductive technology. *Taiwan J Obstet Gynecol*. 2024 May;63(3):341-349.
3. Bosdou JK, Anagnostis P, Goulis DG, Lainas GT et al. Risk of gestational diabetes mellitus in women achieving singleton pregnancy spontaneously or after ART: a systematic review and meta-analysis. *Hum Reprod Update*. 2020 Jun 18;26(4):514-544.

Incidence of neonatal jaundice among Glucose-6-phosphate dehydrogenase-deficient neonates and its association with various risk factors

Introduction

Glucose-6-phosphate dehydrogenase (G6PD) is an essential enzyme in the pathway of pentose phosphate metabolism. It maintains the levels of the co-enzyme nicotinamide adenine dinucleotide phosphate, and through this, glutathione.¹ G6PD deficiency is the most prevalent enzymatic disorder in humans, affecting over 400 million people worldwide, especially in tropical and subtropical regions of the Eastern Hemisphere such as Africa, the Mediterranean, and Southeast Asia. One of the known risk factors for neonatal hyperbilirubinemia severe enough to cause kernicterus or jaundice-related morbidity is G6PD deficiency. This deficiency was linked to malaria

Glucose-6-phosphate dehydrogenase deficiency is a major risk factor for neonatal hyperbilirubinemia and bilirubin-induced neuronal damage.



protection and can result in severe neonatal hyperbilirubinemia due to hemolysis.² This study aimed to estimate the prevalence of neonatal jaundice in G6PD-deficient neonates and to identify associated risk factors.

Methods

This retrospective cohort study included all neonates born with G6PD deficiency. Maternal data collected included gestational age, mode of delivery, nationality, and education about G6PD deficiency. Neonatal data included sex, birth weight, phototherapy needs, peak bilirubin levels, and rebound hyperbilirubinemia. G6PD enzyme activity was measured using the Randox G6PDH assay kit. The primary endpoint was to determine the prevalence of neonatal jaundice in newborns with G6PD deficiency and investigate any potential associations with risk factors. Data were analyzed using descriptive statistics, chi-square tests, Fisher exact tests, and logistic regression.

Results

Among 40,305 babies born during the study period, 1013 (2.51%) had G6PD deficiency, with a male-to-female ratio of 3.3:1. Phototherapy was required for 24.6% of G6PD-deficient neonates. The prevalence of G6PD deficiency varied by nationality, with the highest rates in the Middle East 3.8% (406/10 682). Males had significantly lower G6PD levels than females, but the need for phototherapy did not differ significantly between sexes. Gestational age and birth weight were significantly associated with the need for phototherapy. Logistic regression showed that gestational age <35 weeks had the highest odds for requiring phototherapy. About 200 (80.7%) of the 249 infants who underwent phototherapy were boys, and 49 (19.2%) were girls. Among them rebound hyperbilirubinemia once was experienced in 13.7% of babies, twice in 4% after receiving initial phototherapy. Association of sex with various other parameters among babies who received phototherapy was shown in figure 1.

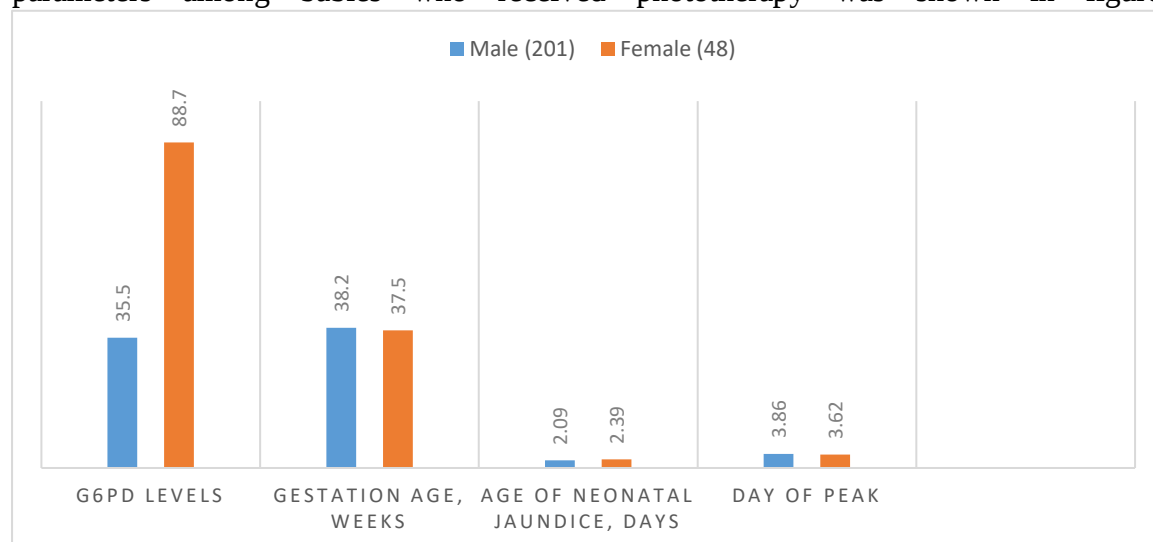


Figure 1. Association of sex with various parameters among babies who received phototherapy



Discussion

Neonatal indirect hyperbilirubinemia (NIH) is a common condition with significant risks for long-term complications. G6PD deficiency is a major risk factor for NIH and severe hyperbilirubinemia. The incidence of G6PD deficiency in this study was consistent with global estimates, and the male predominance reflects the X-linked inheritance pattern.² In this study, 25% of G6PD-deficient neonates developed jaundice needing phototherapy while previous reports have shown that among G6PD-deficient neonates, the rate of phototherapy was 20.3%.³ The routine screening and follow-up practices should be followed for early detection and intervention, reducing the need for exchange transfusions and preventing severe complications like kernicterus.²

Conclusion

G6PD deficiency is a significant risk factor for neonatal hyperbilirubinemia and bilirubin-induced neuronal damage. Routine screening for G6PD deficiency and early intervention with phototherapy are effective strategies for managing neonatal hyperbilirubinemia and preventing severe complications.

References

1. Pal S, Myburgh J, Bansil P, Hann A, et al. Reference and point-of-care testing for G6PD deficiency: Blood disorder interference, contrived specimens, and fingerstick equivalence and precision. PLoS One. 2021 Sep 20;16(9):e0257560.
2. Al-Bedaywi RRR, Salameh KMK, Abedin S, Viswanathan B, et al. Glucose-6-phosphate dehydrogenase deficiency and neonatal indirect hyperbilirubinemia: a retrospective cohort study among 40,305 consecutively born babies. J Perinatol. 2024 Jul;44(7):1035-1041.
3. Kaplan M, Herschel M, Hammerman C, Hoyer JD, Stevenson DK. Hyperbilirubinemia among African American, glucose-6-phosphate dehydrogenase-deficient neonates. Pediatrics. 2004 Aug;114(2):e213-9.

Case Report on Intestinal Perforation during Third Trimester in Pregnant Woman

Introduction

Endometriosis is a neuro-inflammatory condition which is estimated to affect 6%–10% of women of reproductive age and was associated with debilitating chronic pelvic pain.¹ Endometriosis, defined as the presence of endometrial tissue outside the uterus. Incorrect diagnoses are common. Around 12–15% of endometriosis patients have intestinal involvement, predominantly affecting the recto sigmoid (50–90% of cases), with the appendix (3–18%) and cecum (2–5%) less frequently involved. Acute right-sided lower abdominal pain during pregnancy poses a diagnostic challenge, necessitating rapid clarification. Ultrasound is the

Clinicians should be aware of possible endometriosis-associated complications in pregnancy with potentially life-threatening events

primary imaging modality recommended by both German guidelines and the European Federation for Ultrasound in Medicine and Biology (EFSUMB) due to its high sensitivity and specificity.² This case report described a rare instance of cecum and appendix perforation in a pregnant woman caused by deep infiltrating endometriosis.

Case Presentation

A 37-year-old woman with 35th week of pregnancy was admitted due to severe right-sided lower abdominal pain and elevated inflammatory markers (CRP 156 mg/L, leukocytes 17/nl). Patient pregnancy had been uncomplicated until then, though patient reported stool irregularities prior to pregnancy. A colonoscopy two years earlier showed no significant findings. She had experienced abdominal pain, nausea, vomiting, and fever for two days. Physical examination revealed tenderness in the right lower abdomen without rebound tenderness or muscular guarding. Gynecological examination was normal, and the pregnancy was intact. Initial ultrasound was inconclusive due to the extended uterus, and no appendiceal dilation or free peritoneal fluid was detected. The gallbladder appeared normal, and a urinary tract infection was ruled out. Inflammatory markers increased (CRP 193 mg/L) the following day, prompting repeated gynecological and gastroenterological exams. Ultrasound revealed a small amount of free peritoneal fluid between the cecum and uterus, slight cecal wall thickening, and increased echogenicity of adjacent mesenteric adipose tissue. A tubular structure with a thickened, hypoechoic wall was identified, leading to a preliminary diagnosis of acute appendicitis with inflammation of adjacent intestinal loops. Magnetic resonance imaging (MRI) was performed, revealing free peritoneal fluid at the presumed appendix base but no significant phlegmonous penetration (Figure 1). Surgery was deemed necessary, and intraoperatively, fibrinous peritonitis in all four abdominal quadrants, a thickened appendix tip, and perforated cecum and appendix were found. Laparoscopic resection of the cecal pole was performed. Histopathology revealed decidualized endometrium with glands in the appendix and cecum walls, leading to perforation. The patient was discharged six days post-surgery with decreasing inflammatory markers and an intact pregnancy. Four weeks later, patient delivered a healthy boy via cesarean section.

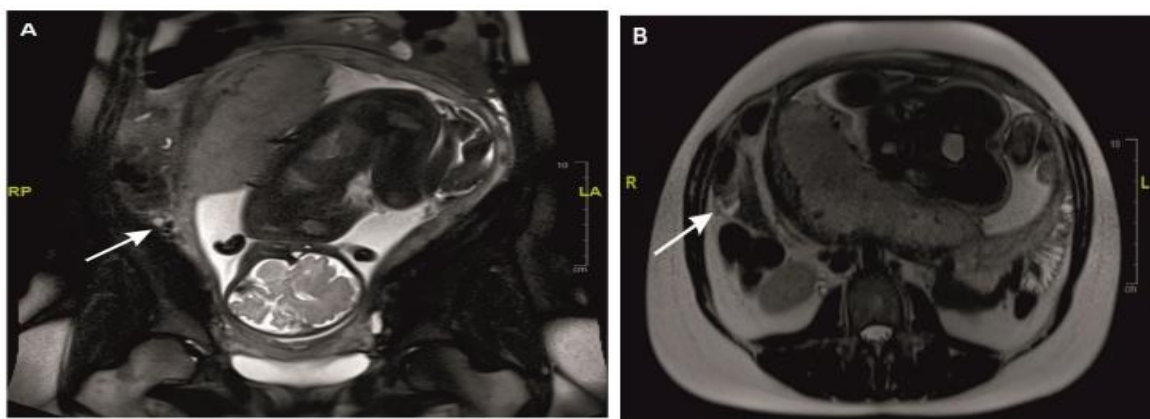


Figure 1. MRI showing small margin of free peritoneal fluid found at presumed base of appendix



Discussion

Endometriosis can manifest intrapelvically or extragenitally, affecting the GI and urogenital tracts. Its pathogenesis involves various factors, including increased retrograde menstruation and endometrial progenitor cells. CXCL12/CXCR4 signalling is crucial, with CXCL12 expression higher in endometriosis lesions. GI involvement often presents with cycle-related abdominal cramps and stool irregularities. Deep infiltrating endometriosis is common in chronic inflammatory bowel disease patients and can mimic acute appendicitis. In pregnant women, sonography is the primary diagnostic tool for right-sided lower abdominal pain, with repeated ultrasounds increasing accuracy.² Previous reports have stated that in unclear cases, MRI is recommended in pregnant women as a choice for diagnosing suspected appendicitis which has higher specificity and sensitivity than ultrasound.³ Endometriosis, undiagnosed in the patient, can adversely affect pregnancy outcomes, though intestinal perforation was rare. Hormonal influences during pregnancy may weaken the intestinal wall, promoting perforation.²

Conclusion

This case highlighted a rare complication of endometriosis in late pregnancy, presenting as perforated appendicitis. Sonography is crucial for initial diagnosis, offering high sensitivity without radiation risk. Repeated sonography can expedite diagnosis, emphasizing its importance in managing right-sided lower abdominal pain in pregnant women.

References

1. Saunders PTK, Horne AW. Endometriosis: Etiology, pathobiology, and therapeutic prospects. *Cell*. 2021 May 27;184(11):2807-2824.
2. Stiegler C, Kapitzka C, Weber F, Patalakh W, Schäfer C. Case report: A rare cause of intestinal perforation in a third-trimester pregnant woman. *Front Med (Lausanne)*. 2024 Jul 3;11:1387043.
3. Badr DA, Selsabil MH, Thill V, Dobos S, et al. Acute appendicitis and pregnancy: diagnostic performance of magnetic resonance imaging. *J Matern Fetal Neonatal Med*. 2022 Dec;35(25):8107-8110.



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