

CASE REPORT

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# How MRI imaging for an ovarian cyst led to diagnosis of short cervix

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## Abstract

**Background** Magnetic resonance imaging (MRI) during pregnancy is a growing diagnostic modality for a variety of different indications including fetal anomalies and maternal masses. A literature search did not find any case reports diagnosing a short cervix on MRI before 20 weeks gestation.

**Case presentation** A 34-year-old female underwent magnetic resonance imaging for further evaluation of a known ovarian cyst which demonstrated a multiseptated cystic mass measuring 15.5 × 9.9 × 18.5 cm in the right adnexa at 19 weeks gestation. An incidental finding on MRI of “bulging of membranes into the cervical canal to the level of the external os” was noted. The patient had 3 prior full-term cesarean deliveries with no history of short cervix. Ultrasound confirmed dilated cervix with no measurable cervix. The patient underwent a rescue cerclage.

**Conclusion** This case describes an unmeasurable cervix diagnosed incidentally during an MRI to characterize a large adnexal mass. In pregnancy, MRI can be a useful imaging modality to evaluate fetal anatomy, placental position and implantation, and abdominal and pelvic structures. In this case, evaluation of the uterus and cervix during imaging for an adnexal mass allowed for detection of an unmeasurable cervix and intervention with a rescue cerclage.

**Keywords** Cervical insufficiency, MRI, Cerclage, Ovarian cyst, Pregnancy

## Background

MRI is a useful diagnostic tool in pregnancy for evaluation of fetal anomalies, placental location and implantation, and abdominal and pelvic structures. Fetal intracranial abnormalities, multiple fetal anomalies and fetal abnormalities that are inconclusive on ultrasound are best assessed via fetal MRI [1]. Placenta accreta is accurately diagnosed on MRI and is of particular use

when posterior accreta is suspected and to determine the depth of invasion [2]. In evaluation of adnexal masses, MRI allows for better definition of tissue planes and tissue composition over ultrasound with high sensitivity and specificity for differentiating benign and malignant masses [3]. MRI is also increasingly utilized for acute abdominal pain in the pregnant patient due to its high diagnostic accuracy and safety. In this setting, MRI can diagnose gastrointestinal causes of pain including appendicitis and inflammatory bowel disease, degenerating fibroids, and adnexal masses and torsion [4].

Adnexal masses are found in 0.05–3.2% of pregnant patients. Persistence of an adnexal mass in pregnancy is more likely when the mass is greater than 5 cm and has complex morphology on ultrasound. In pregnancy, adnexal masses can be surgically removed in the second trimester or expectantly managed [5].

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Abdominal and transvaginal ultrasound is initially used to visualize adnexal masses, with MRI the modality of choice if additional imaging is clinically indicated.

Short cervical length is a marker for preterm birth, which is responsible for significant perinatal morbidity and mortality. Transvaginal ultrasound is used for cervical length assessment and screening is recommended in the second trimester [6]. A rescue cerclage is effective for patients with a very short cervical length < 10 mm [7].

The presented case demonstrates the findings of unmeasurable cervix during an MRI performed for evaluation of a large adnexal mass.

### Case report

A 34-year-old gravid female with 3 prior full term cesarean sections underwent MRI for further evaluation of a known ovarian cyst. On ultrasound, the cyst appeared simple with septations measuring 14.1 cm in largest diameter (Fig. 1).

MRI at 19+2 weeks demonstrated a multiseptated cystic mass in the right adnexa measuring 15.5 × 9.9 × 18.5 cm suggestive of mucinous cystic neoplasm (Fig. 2).

An incidental finding on MRI of “bulging of membranes into the cervical canal to the level of the external os” was noted (Fig. 3).

The patient had 3 prior full-term cesarean deliveries with no history of short cervix and cervical length of 3.25 cm at 16+2 weeks at early anatomy scan (Fig. 4).

The following day at 19+3 weeks gestation, the patient had a transabdominal and transvaginal ultrasound performed with cervix appearing dilated with no measurable cervix (Fig. 5). She was sent to labor and delivery for a rescue cerclage.

The patient was brought to the operating room for a rescue cerclage at 19+4 weeks. On speculum exam, cervix appeared fingertip with visible fetal membranes and on cervical exam was closed and 70% effaced. A McDonald cerclage using a single stitch of 0 prolene was placed with 1 cm of length achieved. Patient tolerated the procedure well and was given indomethacin 50 mg loading dose followed by 25 mg every 6 h for 48 h for post procedure tocolysis. She was discharged with vaginal progesterone nightly and follow up one week later showed a cervical length of 1.0 cm.

Patient presented at 24+4 weeks with preterm prelabor rupture of membranes. She was started on latency antibiotics, given betamethasone for fetal lung maturation and started on magnesium sulfate for neuroprotection. She underwent a cesarean section with removal of right adnexal mass at 26+2 weeks gestation. The adnexal mass was found to be benign.



**Fig. 1** Adnexal mass on ultrasound. Simple appearing adnexal mass with thin septations



**Fig. 2** Adnexal mass on MRI. **A:** Coronal T2 view of adnexal mass (patient's right) and gravid uterus (patient's left). **B:** Sagittal T2 view of adnexal mass



**Fig. 3** Unmeasurable cervix on MRI. Sagittal T2 weighted MRI showing funneling of fetal membranes through cervix and unmeasurable cervical length (arrow)



**Fig. 4** Cervical length at modified anatomy scan. Cervical length at 16+2 weeks measuring 3.25cm



**Fig. 5** Unmeasurable cervix on ultrasound. **A:** Transvaginal ultrasound demonstrating funneling of membranes through internal os to external os. **B:** No measurable cervical length with 0.64cm of dilation

## Discussion

This case describes an unmeasurable cervix diagnosed incidentally during an MRI to characterize a large adnexal mass. In pregnancy, MRI can be a useful imaging modality to evaluate fetal anatomy, placental position and implantation, and abdominal and pelvic structures [8, 9]. In this case, evaluation of the uterus and cervix during imaging for an adnexal mass allowed for detection of an unmeasurable cervix and intervention with a rescue cerclage.

MRI is the imaging modality of choice for further evaluation of adnexal masses. It best distinguishes ovarian neoplasms from benign masses, identifies the site of origin of the mass and its dimensions, and accurately characterizes complex adnexal masses in pregnancy [10–12].

Adnexal masses in pregnancy are at risk of torsion, rupture, and hemorrhage and emergency surgery places patients at increased risk of spontaneous abortion and preterm delivery [13–15]. Elective surgical intervention is recommended in the second trimester but the patient in this case report declined surgical intervention [5, 16].

Short cervical length is a marker for preterm birth, which is responsible for significant perinatal morbidity and mortality. Preterm birth risk increases with shorter cervical length and an unmeasurable cervical length increased the risk of early preterm birth [17, 18]. As such, the American College of Obstetrics and Gynecology currently recommends a screening cervical length during the anatomy assessment between 18 0/7–22 6/7 weeks for all singleton pregnancies without a prior preterm birth. A



cerclage has typically been recommended for those with a history of cervical insufficiency as defined by painless cervical dilation with spontaneous loss or those with a short cervix < 25 mm with a history of preterm birth due to preterm labor. For patients with a singleton pregnancy and no history of preterm birth, a rescue cerclage is effective at reducing preterm birth for patients with a cervical length < 10 mm [17].

While transvaginal ultrasound is the principal modality for assessing cervical length, MRI has been evaluated in diagnosis of short cervix. A case report by Maldjian et al. in 1999 reported a case of cervical incompetence with bulging of fetal membranes through cervical cerclage in a symptomatic patient at 20 weeks that was diagnosed on MRI after abdominal ultrasonography was inconclusive [19]. A case report in 2018 by Negrete and Spalluto described an incidental diagnosis of cervical incompetence during an MRI for an acute appendicitis at 22 weeks gestation. The patient in that case report was placed on bedrest until 32 weeks and delivered full term at 39 weeks via cesarean section [20]. These case reports support the importance of MRI in the diagnosis of cervical incompetence in certain cases. Additionally, the case reported here and the one described by Negrete and Spalluto demonstrate the importance of a full evaluation of fetus, gravid uterus and cervix when a patient is undergoing MRI for other indications to detect incidental findings. These incidental findings can have significant influences on patient outcomes. Ultrasound remains the principal imaging modality to diagnose short cervix in pregnancy. These case reports demonstrate that MRI can be utilized when ultrasound is inconclusive. When MRI is performed for another indication in pregnancy, the cervix should be evaluated to assess for incidental finding of short cervix to allow for early intervention.

## Conclusion

MRI is an important imaging tool that is utilized in pregnancy to evaluate fetal anatomy, placental position and implantation, and abdominal and pelvic structures. In this case report, MRI was used for further classification of a large adnexal mass and incidentally found a short cervix that required intervention with a rescue cerclage. This highlights the importance of a full evaluation of the fetus, uterus and cervix in a gravid patient undergoing an MRI for other indications. Identifying a short cervix can lead to earlier intervention and prolonged gestation, reducing the morbidity and mortality of preterm delivery.

## Abbreviations

MRI Magnetic resonance imaging

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## Author contributions

JS wrote the main manuscript text. AS read the images and provided expertise in radiology. DE and RD guided the direction of the case report. All authors reviewed the manuscript.

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## Data availability

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## Declarations

## Ethics approval and consent to participate

IRB exempt.

## Consent for publication

Informed consent was obtained from the patient for publication of this case report and accompanying images.

## Competing interests

The authors declare no competing interests.

## Clinical trial number

Not applicable.

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