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Radiological Imaging of Vascular Invasion by Invasive Mole- A Rare Case Report

Medical Science

KEYWORDS : invasive mole, gestational trophoblastic disease (GTD), gestational trophoblastic neoplasia (GTN), choriocarcinoma, ultrasound,

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ABSTRACT

Gestational trophoblastic disease (GTD) is a condition that occurs due to abnormal proliferation of trophoblastic tissue. Gestational trophoblastic neoplasia (GTN) refers to the aggressive subset of GTD that has a capability for independent growth and metastases. While ultrasound is investigation of choice, magnetic resonance imaging is used in equivocal cases to assess depth of myometrial invasion and extra-uterine spread. CT has a role in disease staging. We present a case of an invasive mole of the uterus, a subtype of GTN, with distinct ultrasound evidence of vascular invasion. To the best of our knowledge, USG demonstration of vascular invasion by cystic lesions of GTN has never been reported before. This review will describe the relevant pathophysiology and natural history of different GTN's, and the use of imaging techniques in the diagnosis and management of these conditions.

Introduction

Gestational Trophoblastic Disease (GTD) is a term for a group of pregnancy related disorders arising from abnormal placental trophoblastic cells. It encompasses pre-malignant and malignant conditions. Premalignant conditions include partial and complete hydatidiform mole. Malignant conditions are called as gestational trophoblastic neoplasia's (GTN) and include three subtypes; invasive mole, choriocarcinoma and placental site trophoblastic tumor (PSTT)[1]. Invasive mole is a condition where a molar pregnancy invades the wall of the uterus and is responsible for most cases of localized GTN. It follows approximately 10-15% of complete hydatidiform moles and 0.5% of patients with partial mole [2]. Early diagnosis of GTN is important as it has an excellent prognosis following treatment due to exquisite chemosenstivity of most of these lesions. A delayed diagnosis however can result in serious complications like hemoperitoneum and uterine perforation[2].

Case report

A 20 year old lady, gravida1, para 0, presented to our department with abdominal pain, vomiting and irregular vaginal bleeding since the past 1 month. Patient had a history of successful suction evacuation done three months ago for complete molar pregnancy. While her immediate post-operative serum β-hCG showed a decline, patient failed to keep a subsequent serial β-hCG follow up**.**

Patient was referred for an ultrasound, which revealed bulky uterus with heterogeneous echotexture and multiple anechoic cystic areas within the endometrial cavity and myometrium. The lesion was seen extending in the right adnexa with the few cystic lesions inside dilated vessels. These cystic spaces were hydropic villi which had invaded into myometrial vessels. Bilateral ovaries appeared normal. No obvious evidence of an intrauterine gestational sac or ectopic pregnancy was noted. Dilated myometrial and bilateral adnexal vessels were seen with colour doppler showing extensively increased blood flow with aliasing within the dilated vessels. Spectral Doppler showed high velocity (PSV> 50cms/s) and low vascular impedance (RI < 0.4) arterial blood flow.

Based on the clinical history of molar pregnancy in the past, with present ultrasound findings of anechoic cystic areas and extensively increased vascularity with low vascular impedance, a provisional diagnosis of gestational trophoblastic neoplasia was given and correlation with serum β-hCG was suggested. Patients serum β-hCG turned out to be exceptionally high i.e. 80,000 IU/L. To delineate the myometrial invasion and extra-uterine extent of lesion, MR was performed while CT was performed for staging purposes.

MRI pelvis revealed bulky uterus with a large infiltrative ill-defined heterogeneous signal intensity lesion seen involving the right lateral myometrial wall leading to loss of normal zonal anatomy and junctional zone. Full thickness myometrial penetration was noted, with the lesion seen extending into the right adnexa and lower uterine segment. The lesion showed few cystic areas, multiple flow voids and few T1 hyperintense foci which bloomed on GRE sequences s/o haemorrhage.

CT brain, chest and abdomen performed for staging revealed no metastatic lesion and confirmed the MR findings of a large necrotic mass lesion involving the uterus and extending in the right adnexa. On contrast enhanced CT, the lesion showed multiple dilated tortuous vascular channels on arterial phase s/o neovascularity with moderate heterogeneous enhancement & multiple non-enhancing necrotic areas. Multiple dilated tortuous vascular collateral channels were also noted in bilateral parametrium.

MR & CT confirmed the ultrasound diagnosis of GTN and i/v/o no metastatic lesion noted, invasive mole was given as the final diagnosis. Patient was started on chemotherapy and was followed up by serial ultrasounds for 6-9 months. Follow up ultrasound done after 9 months, revealed normal size uterus with restoration of normal zonal anatomy.

Discussion

Gestational trophoblastic disease (GTD) arises when the normal regulatory mechanisms controlling the proliferation and invasiveness of trophoblastic tissue are lost. Gestational trophoblastic neoplasia (GTN) refers to the aggressive subset that has a capability for independent growth and metastases[3]. GTN may arise following evacuation of a molar pregnancy as well as after a normal term or preterm pregnancy, abortion, or ectopic pregnancy. Hence, it is also referred to as persistent trophoblastic neoplasia (PTN)[4]. The clinical presentation of all GTD's is irregular vaginal bleed-

ing, excessive vomiting, an enlarged uterus with high urinary or serum β-hCG level[2,3].

Serial values of bHCG should be obtained after evacuation of molar pregnancy, which if persistently elevated, should raise the suspicion of GTN. The Cancer Committee of the International Federation of Gynaecologists and Obstreticians (FIGO)[1,5,6] has established the following guidelines for the diagnosis of post molar GTN :1)β-hCG level plateau for 4 measurements over a period of 3 weeks or longer, that is, for days 1, 7, 14, and 21;(2)a rise in β-hCG levels for 3 consecutive measurements or longer over a period of at least 2 weeks or more, that is, on days 1, 7, and 14;(3)histological diagnosis of choriocarcinoma;(4)elevated β-hCG levels for 6 months or more after evacuation[8].

These three different subtypes of GTN, i.e invasive mole, choriocarcinoma and placental site trophoblastic tumour, vary considerably in clinicopathologic behavior and propensity for local invasion and metastases. Choriocarcinoma is a highly malignant, necrotic, hemorrhagic, and locally invasive form of GTN. Early and extensive vascular invasion results in metastases even when the primary tumor is quite small[2,3]. Invasive mole is locally invasive that can invade into the myometrium of the uterus or to adjacent structures like the vagina, vulva, broad ligament, and can also invade into the uterine vessels[5] and has no tendency for distant metastasis. PSTT is the rarest form of GTN and arises from the placental implantation site. It is generally a slow growing tumour with a tendency for local and lymph nodal metastases before distant metastases (a very rare feature in choriocarcinoma).

It is important to distinguish between invasive mole and choriocarcinoma, as the former has a more favorable outcome. While in invasive mole, the interval from an antecedent molar pregnancy is usually less than six months, in choriocarcinoma it is usually more than six months, sometimes lasting for nearly ten years. The presence of metastasis helps to rule out invasive mole and β-hCG levels are much higher in choriocarcinoma than in invasive mole.[7]

Ultrasound is the standard investigation in diagnosis of suspected GTN [8,9]. On ultrasound, an invasive hydatidiform mole, PSTT and choriocarcinoma are indistinguishable from each other and appear heterogeneously hyperechoic, with solid mass and cystic vascular spaces seen within the myometrium. [10,11]. Bilateral enlarged ovaries due to theca lutein cysts may be seen [6]. Doppler and spectral findings exhibit aliasing with low-impedance, high velocity arterial flow with RI value of less than 0.4 and PI value less than 1.5, suggestive of angiogenesis and neovascularisation, which is characteristic in these tumours. [10]

The diagnosis of PSTT is, however is suspected when there are ultrasound findings of GTN with very low levels of β-hCG. It is important to differentiate PSTT from invasive mole or choriocarcinoma as it is relatively chemoresistant and often requires hysterectomy for treatment [12].

MRI is generally not used in routine evaluation of GTN and is used in equivocal cases to assess the depth of myometrial invasion and extrauterine disease spread. It is also used in suspected cases of PSTT and recurrent GTN. GTN appear heterogeneously hyperintense on T2 and isointense on T1 with few T1 hyperintense areas due to haemorrhage also noted within. On MRI, they have a myometrial epicentre, distort the normal zonal anatomy and are associated with uterine enlargement. Parametrial invasion is seen as heterogeneous T2 hyperintense masses beyond the uterus[12].

On contrast enhanced MRI, GTN show marked heterogeneous enhancement. Prominent tortuous flow voids are noted in the tumor, adjacent myometrium, parametrium and adnexae with prominent internal iliac vessels. PSTT, however shows poor enhancement and absence of increased vascularity.

CT is principally used for detection of metastatic disease. Uterine disease is seen as enlarged uterus with focal irregular low attenuation lesions with parametrial disease spread seen as enhancing tissue in this region[12].

The differential diagnosis of highly vascular, intramural lesions of the myometrium seen by ultrasound includes arteriovenous malformation and interstitial pregnancy [13]. Arterio-venous malformation appears heterogeneously hyperechoic with cystic spaces within and usually occur secondary to previous curettage. Like GTN, they show increased flow with low vascular impedance, however no increased levels of β-hCG are seen.[14]

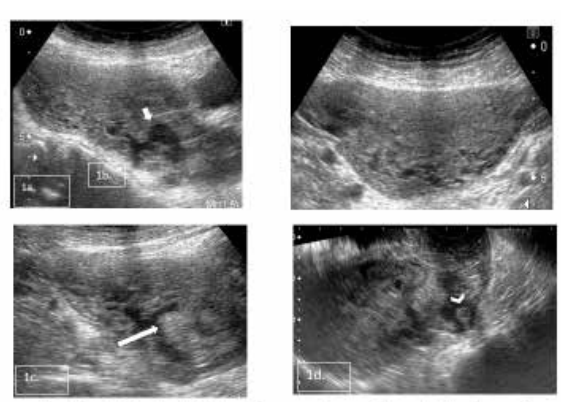
Management of both invasive mole and choricarcinoma includes treatment with chemotherapy with serial evaluation of bHCG levels. Patients with GTN should be followed with weekly quantitative β-hCG levels until normal for three consecutive weeks, then monthly for 12 months [15]. Ultrasound and color dopplerare effective in predicting the resolution or persistence of GTN[16] and with effective chemotherapy, the lesions become progressively smaller and hypoechoic, with decrease tumour and adnexal vascularity and restoration of normal zonal anatomy. Dilatation and curettage is not recommended due to the risk of uterine perforation[5]. With methotrexate, complete remission is achieved in most non-metastatic and low risk cases[17]. Even in the presence of disseminated disease, most of the cases are amenable to treatment with almost 100% survival[18].

Conclusion

Ultrasound plays a key role in diagnosis and post chemotherapy follow up of GTN.

Demonstration of a highly vascular uterine mass, with loss of normal zonal myometrial anatomy being the key ultrasound findings. Visualization of vascular invasion by cystic lesions of GTN is a specific sign and can aid in its diagnosis.

Bibliography



Transabdominal longitudinal (a) and transverse images (b) reveal bulky uterus with heterogeneous echotexture, with loss of normal zonal architecture and multiple anechoic areas suggestive of vascular spaces (small white arrow) and hydropic villi are noted within the uterus. An ill-defined mixed echogenic mass with few echogenic nodules (white long arrow) is noted within the right half of myometrium. Longitudinal transvaginal scan revealed a cystic lesion (arrowhead) within a dilated vessel. This cystic lesion is a hydropic villi which has invaded into a myometrial vessel.

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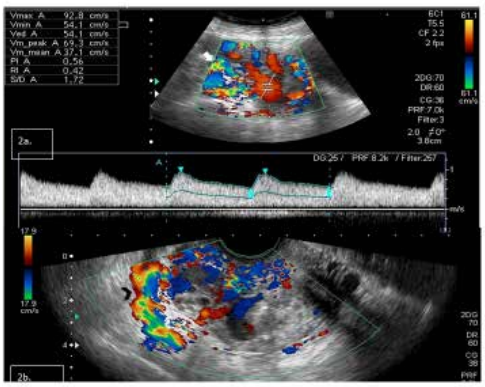
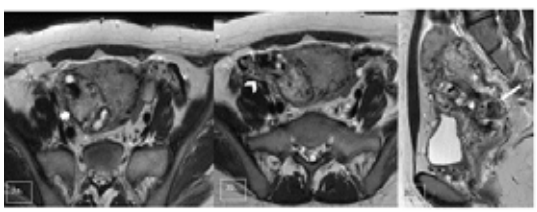
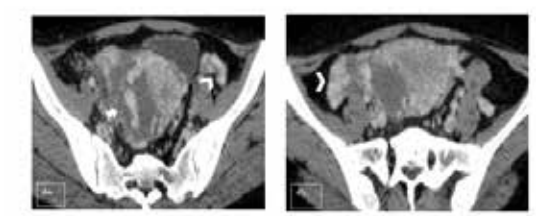


Transabdominal (a) and transvaginal Doppler (b) revealed extensive vascularity with aliasing in uterus (white arrow) and adnexa (black arrowhead). Spectral Doppler revealed high velocity low resistance flow.



Axial T2w MRI (a,b) and coronal (c) sections revealed bulky uterus with infiltrative ill-defined heterogeneous signal intensity lesion (small white arrow) involving the right lateral myometrial wall. The lesion shows full thickness myometrial penetration and is seen extending in right adnexa (white arrowhead) and lower uterine segment. Multiple flow voids suggestive of dilated vessels were noted within the lesion (black arrow), myometrium and adnexa.



Post contrast axial sections CT (a,b) revealed that the lesion showed heterogeneous enhancement with multiple non enhancing areas within s/o necrosis (white arrow). Multiple dilated tortuous vessels were noted in the lesion and bilateral adnexa (white arrowhead).

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