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LEIOMYOMA OR LEIOMYOSARCOMA. CAN MRI BE THE KEY TO DIAGNOSIS?

Obstetrics & Gynaecology

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ABSTRACT

Leiomyosarcoma is a rare aggressive malignant mesenchymal tumour which accounts for 1% of all malignancies. The diagnosis of leiomyosarcoma preoperatively is difficult on ultrasound due to its similarity with degenerated leiomyoma on scanning. Generally, leiomyosarcoma is a post -operative histopathological diagnosis. With this case report we will the discuss the role of MRI in differentiating leiomyosarcoma from leiomyoma.

KEYWORDS

leiomyoma, leiomyosarcoma, MRI, Key

INTRODUCTION:

Leiomyomas are most common benign pelvic tumours with a prevalence of 77% and account for 41% of hysterectomies performed for women 44 -64 years of age.[1] Hysterectomy is the definitive treatment of leiomyoma and myomectomy is the conservative management. Both these surgeries can be performed by open as well as by minimally invasive routes. Laparoscopically these huge masses are removed by power morcellation and if leiomyosarcomas are undetected preoperatively can result in their dissemination and upstaging of this highly malignant tumour.[2] Thus, the urgent need of modalities to distinguish pre-operatively between leiomyoma and leiomyosarcomas. With this case report we will explore and search the role of MRI in distinguishing these two modalities.

Case Report:

A 44-year-old femaleP1L1 presented with history of heavy menstrual bleeding of two years duration and increasing abdominal distension for 1 month. The menorrhagia was gradually progressive and was associated with moderate and spasmodic dysmenorrhoea. Her first pregnancy was a full-term delivery and with no complications. The second pregnancy which was 1 year after the first was medically terminated at 2-month gestation. The patient had no further conceptions and used condom as contraception. Patient gave history of right sided cystectomy for ovarian cyst done 7 years back. General physical examination revealed mild pallor. Chest and lungs were clear. Abdominal examination revealed a firm to hard, non- tender mobile mass originating from pelvis and extending 10 cm above pubic symphysis. Per vaginal examination revealed a pulled-up cervix and the fornices were obliterated. Her ultrasound revealed enlarged uterus (18x12 cm) with impression of degenerated fibroid uterus or suspected leiomyosarcoma. Pap smear was normal. Hb was 8 gm per dl and rest of all the parameters were normal. Her endometrial biopsy revealed secretory endometrium. MRI with contrast revealed a gigantic irregular tumour arising from fundus 18 cmx17.1 cmx10 cm with multiple hypointense on T1 weighted and hyperintense on T2weighted scan with multiple bilateral enlarged common and internal lymph node suggestive of leiomyosarcoma or degenerated fibroid.(figure1) Exploratory laparotomy was done with total abdominal hysterectomy with bilateral salping-oopherectomy. Pelvic and paraaortic lymph node dissection was also done for appropriate debulking and staging. Patient intra op and post op period was uneventful and was discharged in satisfactory condition.

Histopathology revealed: Gross examination revealed a globular mass of 25x25 12.5 cm with smooth outer surface. The cut inner section revealed homogenous nodules of varying sizes with solid white whorled appearance. The histopathology revealed cervix as hyper keratinized, hypertrophied squamous epithelium with chronic papillary cervicitis, left tube was normal and left ovary showed features of endometriosis. Section of uterus revealed a circumscribed tumour mass composed of interlacing and intersecting fascicles of benign smooth cells with hyaline degeneration suggestive of benign degenerated leiomyoma. (figure2 and 3)

DISCUSSION:

Uterine leiomyoma is the most common benign tumour of ovary. The leiomyosarcoma is the rare malignant transformation of leiomyoma which occurs in perimenopausal women between 40 to 45 years.[3] It is fast growing tumour, highly aggressive and the prognosis is poor with poor survival rate with increasing stage.[4] This entity is difficult to identify on ultrasound hence the need for exploration other modalities and one such modality is MRI. The definitive diagnosis of leiomyosarcoma is on histopathology which is characterized by hypercellular spindle cells, diffuse moderate to serious cell atypia with a high mitotic index >15/ hpf, atypical mitosis and tumour cell necrosis.[5] The different degenerations of fibroid are hyaline, cystic, myxoid, red and calcific degeneration. They can also present with varying signal intensity on T1 and T2 weighted images and pose a diagnostic challenge in detecting this lethal malignant tumour[6]. (Table1) The different parameters studied on MRI are shape, signal intensity on T1 weighted images, signal intensity on T2 weighted Although MRI can be useful in differentiating leiomyoma from leiomyosarcoma yet it is difficult due to the overlapping features of these different entities and pre-op definitive diagnosis is difficult. The accuracy, sensitivity, specificity, positive predictive and negative predictive value of MRI in diagnosing leiomyosarcoma is not yet established.[7]

Due to coexisting degenerations in leiomyoma as well as leiomyosarcomas makes the definitive diagnosis of leiomyosarcoma more difficult. Leiomyomas are round and oval with variable SI onT1 weighted images whereas SI on T2 weighted images can range from hyper to hypointense hence T1 and T2 weighted images a. The SI on DW I images and ADC is hypointense with marked enhancement on contrast enhanced images.

In cases of leiomyosarcoma they are ill-defined, irregular, hyperintense on T1 and T 2 weighted images with hyperintense SI on DWI images and hypointense on ADC images with variable enhancement on contrast enhanced images. A combination of ADC values of less than 1.23, increased SI on DW I, increased SI on T2 weighted images yields a positive predictive value of 92.2% in predicting leiomyosarcomas.[8] In another study done by Sato et al on 10 leiomyosarcomas showed all of them showed high SI on DWI and an ADC value of 1. 095[9]. De Mulder et all developed an algorithm to stratify the lesions into two LMS groups: a low risk and high-risk

group. A low risk if it showed high SI on DW1 and ADC value greater than 1. 1. High risk included high SI on DW1 images and ADC value; less than 1.1. This algorithm had a sensitivity of 100%, specificity 94%, positive predictive value of 66% and 100% negative predictive value. The short coming of these studies was that they were done in small no of cases of leiomyosarcomas hence the need of more substantial studies on larger number of cases of LMS to credit MRI as their key to diagnosis.

CONCLUSION:

Early recognition and diagnosis of uterine sarcomas is imperative in providing optimum patient care and improving patient outcomes. A pre-operative distinction between uterine leiomyomas and uterine leiomyosarcomas using subtle differentiating parameters in MRI is an additional tool in the hands of the clinicians to plan the course of treatment for such patients but the definitive and the key to diagnosis of leiomyosarcoma is still histopathology.

Hence, if any premenopausal women with rapidly growing tumour and MRI showing features of leiomyosarcomas on MRI should be treated as leiomyosarcoma and a radical surgery should be performed. The use of power morcellator to remove such suspected cases of leiomyosarcoma should not be advocated.

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Table 1: Multiparametric contrast enhanced MRI features of different Myomas, Degenerated myomas, STUMP and leiomyosarcomas.

Entity	shape	SI ON T1 weighted images	SI on T2 weighted images	Early Enhancement	Restriction on DW and ADC images
LEIOMYOMA	Round	Homogenous isointense	Homogenous hypointense	yes	no
Hyaline degeneration	Round/oval	Hypointense isointense	Hypointense	no	no
Cystic degeneration	Round/oval	Hypointense	hyperintense	none	no
Red degeneration	Round/oval	Peripheral/ Diffuse hyperintense	Peripheral/ Diffuse hypointense	no	no
Calcific degeneration	Amorphous central or peripheral	Hypointense	Hypointense	no	no
HISTOLOGY					
Cellular leiomyoma	Round/oval	variable	Diffuse Hyperintense	marked	yes
Leiolipoma	Round/oval	Heterogenous /Hyperintense	Heterogenous hypointense	marked	unknown
STUMP	Round/oval	Heterogenous hyperintense	Heterogenous hyperintense	variable	unknown
Leiomyosarcoma	Irregular	Heterogenous/hyperintense	Heterogenous/hyperintense	heterogenous	Hyperintense/hypointense with restricted diffusion

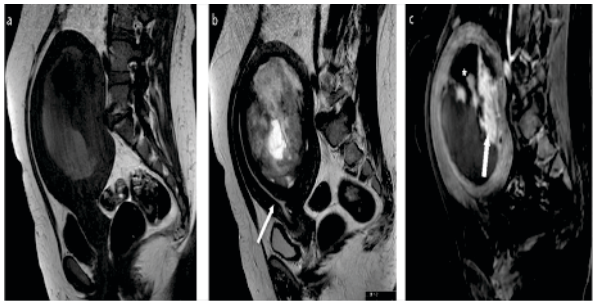

Figure 1 a T1 Weighted scan: Large uterine mass with ill defined margin and heterogenous T1 weighting, presenting high signal areas translating haemorrhagic transformation

bT2 Weighted scan: Heterogenous hyperintense areas within the mass lesion depicting degenerating changes with fluid filled endometrial cavity displaced anterioinferiorly

c TI weighted scan after gadolinium administration corresponding to hypervascular neoplastic tissue(arrow), low signal necrotic region(star) and intermediate signal in most hemorrhagic areas(as evident in T1 weghted images)

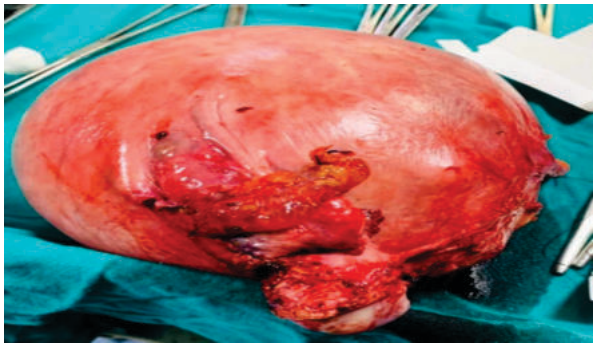

Figure 2: Gross appearance of operated organs

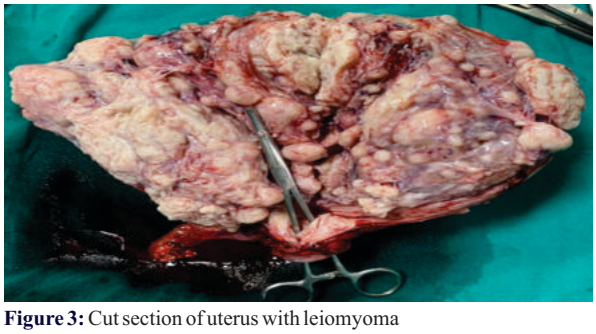

Figure 3: Cut section of uterus with leiomyoma

Abbreviations:

MRI (Magnetic Resonance Imaging), LM: leiomyoma, LMS: leiomyosarcoma, SI Signal Intensity, ADC: Apparent Diffusion coefficient, DWI: Diffuse Weighted images

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