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Embryonal Rhabdomyosarcoma of the Uterine Cervix: A Multimodality Imaging Case Report

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Abstract **Case Report**

Embryonal rhabdomyosarcoma of the uterine cervix is a rare malignant mesenchymal tumor affecting mainly adolescents and young women. Clinical presentation is often nonspecific, making imaging a key element for early diagnostic suspicion. We report the case of a 26-year-old woman presenting with a bleeding cervical mass prolapsing through the vulva. Pelvic ultrasound demonstrated a solid-cystic cervical mass with a vascularized tissue component on color Doppler, while pelvic MRI revealed a large exophytic cervical lesion with heterogeneous signal intensity and marked contrast enhancement. Thoraco-abdominopelvic computed tomography showed no evidence of distant metastasis. Histopathological examination confirmed the diagnosis of embryonal rhabdomyosarcoma. This case highlights the complementary role of ultrasound, MRI, and CT in diagnosis, staging, and multidisciplinary management.

Keywords: Embryonal rhabdomyosarcoma; uterine cervix; pelvic MRI; gynecologic sarcoma; diagnostic imaging.

INTRODUCTION

Rhabdomyosarcoma [RMS] is a malignant soft-tissue tumor arising from primitive mesenchymal cells with skeletal muscle differentiation. The embryonal subtype is the most frequent variant involving the female genital tract, while primary cervical involvement remains exceptionally rare, accounting for less than 1% of malignant cervical tumors [1,2]. Cervical embryonal rhabdomyosarcoma predominantly affects adolescents and young women and may clinically mimic benign cervical lesions, leading to delayed diagnosis [3].

Imaging plays a pivotal role in raising early diagnostic suspicion and assessing disease extent. While ultrasound is often the first-line modality and computed tomography is used for staging, magnetic resonance imaging [MRI] remains the cornerstone for lesion characterization and local staging. We report a case of cervical embryonal rhabdomyosarcoma with emphasis on multimodality imaging findings.

CLINICAL OBSERVATION

A 26-year-old woman of reproductive age, with no significant medical history, presented with a rapidly progressive cervical mass prolapsing through the vulva, associated with abnormal vaginal bleeding. Gynecological examination revealed a large, friable, ulcerated, exophytic cervical lesion. Pelvic ultrasound, pelvic MRI, chest radiography, and thoraco-abdominopelvic CT were performed for lesion characterization and staging.

Ultrasound Findings

Transabdominal pelvic ultrasound revealed a large cervical mass with mixed solid-cystic echotexture [figure 1 [a, b, c]]. A vascularized solid component was identified on color Doppler imaging [figure 1 [b, c]], suggesting a malignant process. The uterine fundus was preserved [figure 2 [a]], with no evidence of myometrial or endometrial invasion [figure 2 [b, c]]. These findings, although nonspecific, raised suspicion for a malignant cervical tumor and prompted further MRI evaluation [10,11].

MRI Findings

Pelvic MRI revealed a bulky abdominopelvic mass, well-defined, encapsulated, centered on the cervicovaginal region [figure 4]. The lesion was heterogeneously hypointense on T1-weighted images [figure 4 [d]] and intermediate signal intensity on T2-weighted images, with a cystic component and multiple septations [figure 4[a, b, c]], and diffusion restriction [figure 4 g, f]].

Following gadolinium administration, intense and heterogeneous enhancement was observed [figure 4

[e, f]]. The mass extended toward the vaginal lumen without evidence of parametrial invasion [figure 5 [c]] or uterine body involvement [figure 5 [a,b]]. MRI allowed precise local staging and confirmed the preservation of adjacent pelvic structures, consistent with previously reported imaging features of cervical embryonal rhabdomyosarcoma [4,5].

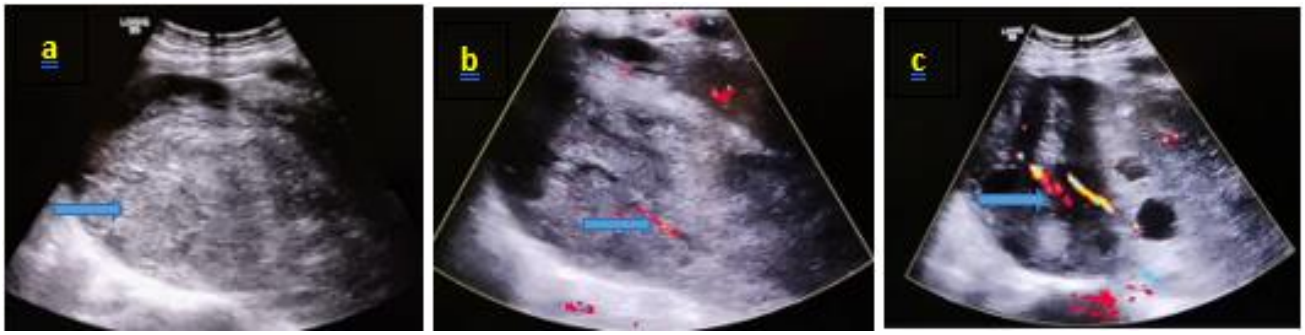

Figure 1: large cervical mass with mixed solid-cystic echotexture [a, b and c]. A vascularized solid component was identified on color Doppler imaging [b, c]. suggesting a malignant process. The uterine fundus was preserved, with no evidence of myometrial or endometrial invasion

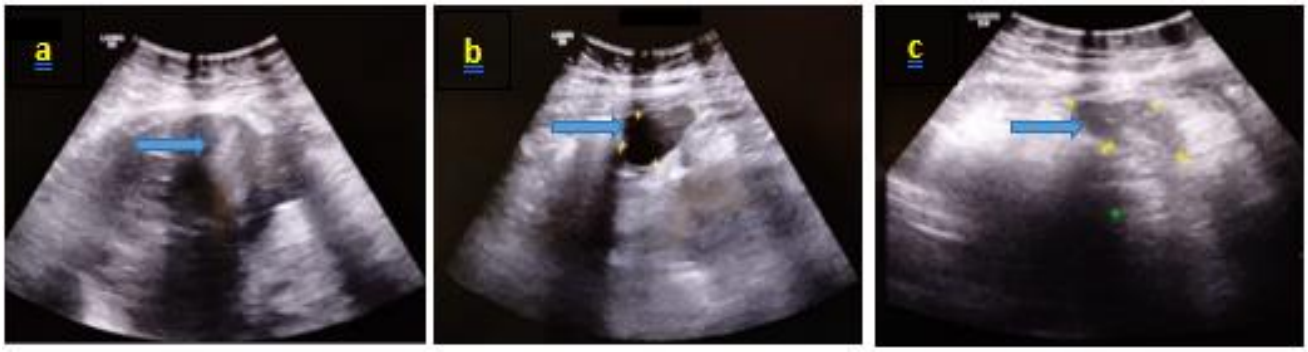

Figure 2 : the uterus [a] and Both ovaries [Right [b] and left [c]] showed normal imaging appearance. suggesting a malignant process. The uterine fundus was preserved, with no evidence of myometrial or endometrial invasion

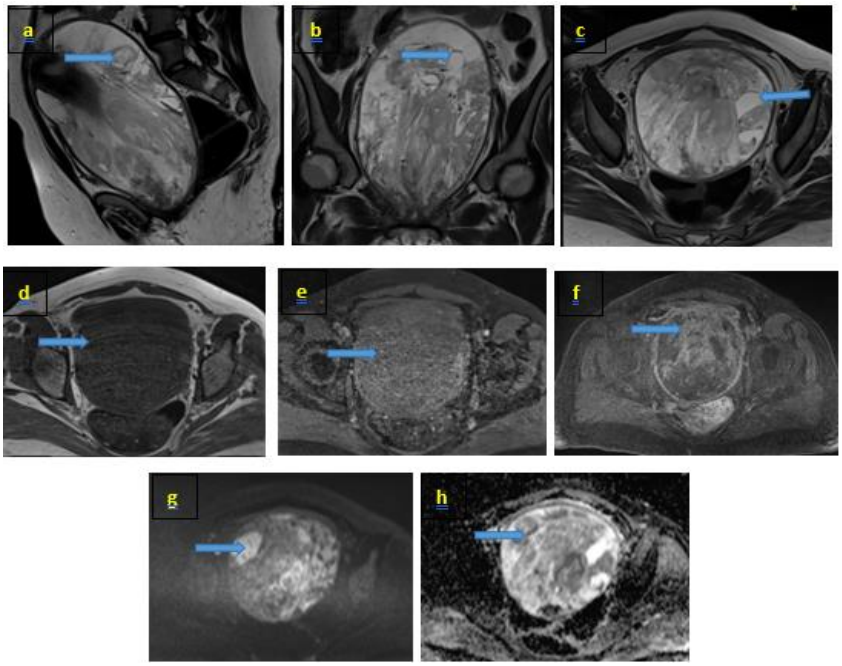

Figure 4 : Bulky abdominopelvic mass, well-defined, encapsulated, centered on the cervicovaginal region. The lesion was heterogeneously hypointense on T1-weighted images [d] and intermediate signal intensity on T2-weighted images [a, b and c], with a cystic component and multiple septations [a, b and c]; Diffusion restriction [g, h] and an intense and heterogeneous enhancement was observed after gadolinium administration [e, f]

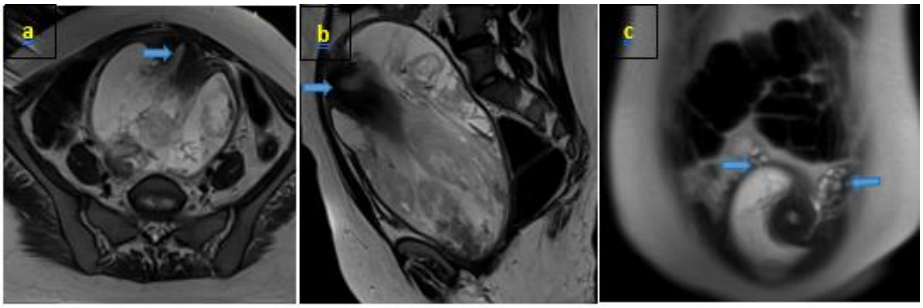

Figure 5 : The mass extended toward the vaginal lumen without evidence of parametrial invasion [c] or uterine body involvement [a, b]. MRI allowed precise local staging and confirmed the preservation of adjacent pelvic structures

Clinical Management

Given the significant discomfort related to the prolapsing cervical mass and its externalization through the vulva, the patient underwent an interadnexal hysterectomy following MRI evaluation. Thoraco-abdominopelvic computed tomography was subsequently performed as part of the postoperative staging workup.

CT and Chest Imaging Findings

Chest radiography showed no pulmonary abnormalities [figure 3]. Thoraco-abdominopelvic computed tomography performed as part of the extension workup demonstrated a non invasion of adjacent pelvic organs, lymph node enlargement, or distant metastatic lesions including pulmonary, hepatic, or osseous involvement were identified [figure 6]. Postoperative changes were noted, including pneumoperitoneum.

CT findings contributed to staging and therapeutic planning by excluding distant disease [6,12].

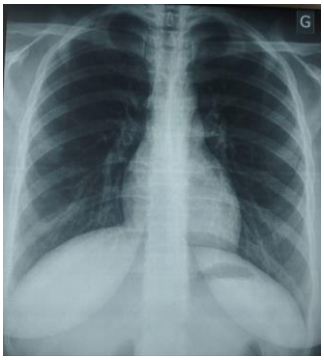

Figure 3 : Chest radiography showed no pulmonary abnormalities.

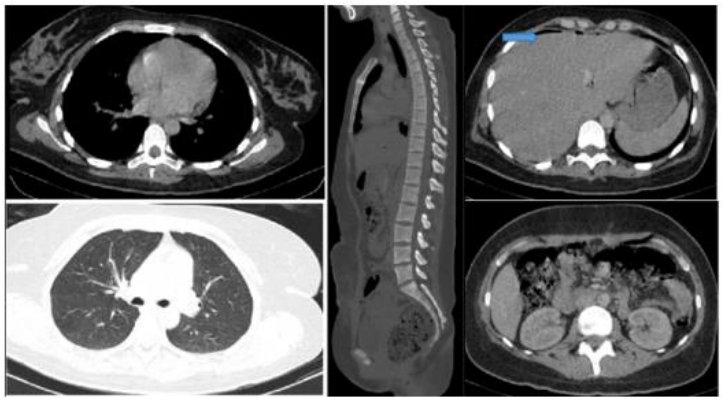

Figure 6 : Thoraco-abdominopelvic computed tomography demonstrated a non invasion of adjacent pelvic organs, lymph node enlargement, or distant metastatic lesions including pulmonary, hepatic, or osseous involvement were identified. Postoperative changes were noted, including pneumoperitoneum [blue arrow].

Pathological Findings

Histopathological examination of the biopsy specimen showed A malignant undifferentiated neoplastic proliferation, with morphological features most consistent with a markedly remodeled embryonal rhabdomyosarcoma.

differentiation, with negative staining for epithelial markers [CK7] and smooth muscle actin. The Ki-67 proliferation index was high [approximately 80%], indicating a highly proliferative tumor.

Although the histological report suggested features in favor of an alveolar subtype, the overall morphological and immunohistochemical profile remained compatible with rhabdomyosarcoma, and correlation with clinical and imaging findings was recommended.

DISCUSSION

Epidemiology and Clinical Presentation

Cervical embryonal rhabdomyosarcoma mainly affects young women, with a reported mean age between 20 and 25 years [1]. Common presenting symptoms include abnormal vaginal bleeding, vaginal discharge, and the presence of an exophytic cervical mass. The botryoid variant may present with a characteristic grape-like appearance [2,6].

Imaging Features

Imaging plays a pivotal role in the diagnosis and staging of cervical embryonal rhabdomyosarcoma. Ultrasound is often the first-line modality, typically revealing a heterogeneous solid or solid-cystic cervical mass with internal vascularity on Doppler imaging, although findings remain nonspecific [10,11].

MRI is the imaging modality of choice for local assessment, providing superior soft-tissue contrast and accurate evaluation of tumor extent, parametrial involvement, and uterine preservation. Typical MRI features include a large exophytic mass with high T2 signal intensity and marked contrast enhancement [4,5].

Computed tomography is mainly used for staging purposes to detect nodal or distant metastases and to guide multidisciplinary management [6,12].

Differential Diagnosis

Differential diagnoses include cervical carcinoma, leiomyosarcoma, adenosarcoma, benign cervical lesions, and, more rarely, cervical lymphoma. Definitive diagnosis relies on histopathological and immunohistochemical analysis [3,7].

Management and Prognosis

Management requires a multidisciplinary approach combining surgery—preferably fertility-sparing when feasible—and chemotherapy, most commonly using VAC-based regimens. Radiotherapy is reserved for selected cases [1,6]. Prognosis is generally more favorable than that of other gynecologic sarcomas, particularly when early diagnosis and appropriate treatment are achieved [8]. Recent reviews emphasize the importance of integrating imaging, pathology, and conservative therapeutic strategies whenever possible [9].

CONCLUSION

Embryonal rhabdomyosarcoma of the uterine cervix is a rare but important diagnostic consideration in young women presenting with an atypical cervical mass. A multimodality imaging approach is essential, with ultrasound providing initial evaluation, MRI allowing accurate lesion characterization and local staging, and CT contributing to the assessment of disease extension. Familiarity with the imaging features across modalities can facilitate early diagnosis and optimize multidisciplinary management.

Conflict of Interest: The authors declare no conflict of interest.

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