

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: <http://Elsevier.com/locate/radcr>

Case Report

Magnetic resonance imaging of adenoma malignum of the uterine cervix with pathologic correlation: a case report

Alba Castán Senar MD^{a,*}, Blanca Paño MD^b, Adela Saco MD^c, Carlos Nicolau MD^b

^a Department of Radiology, Hospital Universitario Miguel Servet, Paseo Isabel la Católica, 1-3, Zaragoza 50009, Spain

^b Departament of Radiology, Hospital Clínic, Barcelona, Spain

^c Department of Pathology, Hospital Clínic, Barcelona, Spain

ARTICLE INFO

Article history:

Received 12 April 2016

Accepted 12 August 2016

Available online 20 September 2016

Keywords:

Adenoma malignum

Minimal deviation adenocarcinoma

Cervical cancer

Magnetic resonance imaging

Diffusion-weighted imaging

ABSTRACT

Adenoma malignum (AM) is considered a rare subtype of cervical adenocarcinoma. Although previous reports have described magnetic resonance findings, none of these reports evaluated the utility of diffusion-weighted imaging in the differential diagnosis of AM and other multicystic cervical lesions. We present a case report of an AM that did not show restriction on the apparent diffusion coefficient map, which can be explained by the low cellularity of the tumor. This is consistent with the proper correlation between the diffusion imaging and histopathology of the tumor. In this way, AM can present with high apparent diffusion coefficient values, as in benign cervical lesions. Therefore, the combination of a solid multicystic lesion that invades the cervical stroma on T2-weighted magnetic resonance images and the absence of restriction on the apparent diffusion coefficient map are very suggestive of AM.

© 2016 the Authors. Published by Elsevier Inc. under copyright license from the University of Washington. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Introduction

Adenoma malignum (AM), also termed minimal-deviation adenocarcinoma, is considered a rare form of mucinous adenocarcinoma of the cervix. AM was first described and named by German gynecologist Gusserow in 1870 [1]. In 1975, Silverberg and Hurt et al. [2] considered its pathologic form to be a type of well-differentiated cancer, and thus suggested the term “minimal-deviation adenocarcinoma.” In 2003, the World Health Organization further described the neoplasm as a “very well-differentiated endocervical-type mucinous

adenocarcinoma composed mostly of lobular endocervical glandular hyperplasia-looking glands but with the characteristics of invasive adenocarcinoma” [3].

Very few studies have described the imaging characteristics of AM, and there is only one study on the utility of diffusion-weighted imaging (DWI) in the diagnosis of AM [4].

The purposes of presenting this case were to: (1) illustrate magnetic resonance imaging (MRI) findings of AM with a focus on DWI; (2) discuss the differential diagnosis; and (3) correlate radiological and pathologic findings.

The authors stated no financial relationship to disclose.

* Corresponding author.

E-mail address: albacastansenar@gmail.com (A. Castán Senar).
<http://dx.doi.org/10.1016/j.radcr.2016.08.008>

1930-0433/ © 2016 the Authors. Published by Elsevier Inc. under copyright license from the University of Washington. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Case report

A 37-year-old woman presented with low abdominal pain and vaginal bleeding. The patient had sporadic Peutz–Jeghers syndrome with de novo mutation. Her medical history included intestinal hamartomatous polyposis, small bowel resection that was performed for intussusception, left breast lumpectomy for intraductal papilloma, and bilateral oophorectomy for ovarian sex cord tumor with secondary iatrogenic premature ovarian failure and subsequent treatment with hormone replacement therapy.

Two months before the initial diagnosis, the patient presented with metrorrhagia and profuse, watery vaginal discharge initially thought to be secondary to hormone therapy.

Gynecologic examination revealed that the cervix was enlarged, but the mucosa was normal in appearance.

Transvaginal ultrasound identified a poorly vascularized and heterogeneous submucosal lesion in the cervix and fluid accumulation in the endometrial cavity secondary to cervical stenosis produced by the lesion (Fig. 1).

Cytology from endocervical canal curettage was nondiagnostic.

Pelvic MRI revealed a distended endometrial cavity with fluid accumulation (Fig. 2A) secondary to diffuse thickening of the cervical stroma with disappearance of the normal low-signal intensity on T2-weighted sequence. These changes were secondary to a 65 × 32 × 30-mm cervical mass showing isointensity on T1-weighted sequence (Fig. 2B) and heterogeneous hyperintensity on T2-weighted images (Figs 2C–E). The lesion was composed of multiple cervical microcysts (>20) and a solid component. Cysts were small in size, measuring up to 5 mm in diameter and with smooth walls. The solid component infiltrated deeply into the cervical stroma on the right side, and infiltration was less evident on the left side suggesting right parametrial extension and probably left parametrial involvement (Figs 2C and E). The solid portion also invaded the lower third of uterine body, uterine isthmus, and superior and anterior third of the vagina (Fig. 2A). On contrast-enhanced T1-weighted images, the lesion was hyperintense (Fig. 2F).

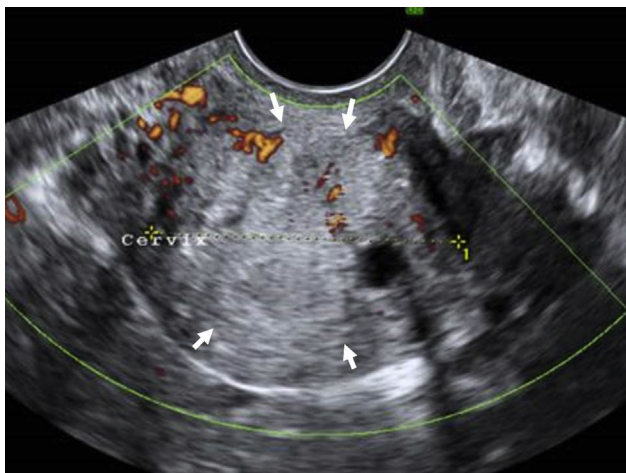


Fig. 1 – Transvaginal ultrasonography demonstrates a poorly vascularized and heterogeneous submucosal lesion in uterine cervix (arrows).

On DWI, the solid and cystic components of the tumor were hyperintense on the high-*b*-value images (*b*, 800; Figs 3A and B) but showed no restriction on the apparent diffusion coefficient (ADC) map (Fig. 3C).

Despite the absence of restriction on the ADC map, the presence of mixed cystic and solid lesion with stromal invasion in a patient with Peutz–Jeghers syndrome was highly suggestive of malignancy, particularly of AM.

Preoperative deep biopsy showed proliferation of well-differentiated endocervical glands with mucinous metaplastic changes, showing very little cellular atypia and low mitotic activity. Deep extension of these aberrant glands was associated with a desmoplastic stroma. Immunohistochemical study demonstrated focal but intense positivity for carcinoembryonic antigen (CEA). The overall appearance was considered highly suspicious of AM. The patient underwent a modified radical hysterectomy with pelvic lymphadenectomy and adjuvant chemotherapy and radiotherapy. Final surgical pathology confirmed the diagnosis of AM (Fig. 4). Histologically, the cervical mass showed tumor extension to the parametrium, vagina and uterine body, and vascular and perineural invasion. Microscopic metastases in the pelvic lymph nodes were found bilaterally.

Vaginal cuff recurrence and nodal and peritoneal dissemination were found seven months after the initial diagnosis.

Discussion

AM is a rare carcinoma of the cervix with an estimated prevalence of 3% of all cervical adenocarcinomas and of 0.3% of all cervical carcinomas of the uterus [5]. The prognosis of AM is poor with lower survival rates than conventional adenocarcinoma because dissemination into the peritoneal cavity and distant metastasis occurs during the early stage of the disease. AM is associated with Peutz–Jeghers syndrome, ovarian mucinous tumor, and ovarian sex cord tumor.

Clinically, the most characteristic symptom is a watery vaginal discharge, but this is nonspecific and may be the main complaint of patients with benign cystic uterine lesions. Furthermore, in early stages of the disease, the gynecological examination may be normal.

The detection rate of AM by cytologic evaluation is only around 32% [6]. Because the tumor is located deep in the endocervix and exhibits an endophytic growth pattern, it is difficult to make an accurate cytological diagnosis by a routine Papanicolaou test.

Therefore, imaging techniques and particularly MRI play an important role in the preoperative diagnosis and evaluation of AM. MRI shows the most detailed features and correlates them with histologic findings. At MRI, AM is seen as a multicystic lesion with solid component invading the cervical stroma and marked hyperintensity on T2-weighted images [7]. On contrast-enhanced images, there might be enhancement of the solid component, as in cervical carcinomas, including adenocarcinomas.

AM features on DWI have been previously described by only one paper [4]. In contrast to that paper [4], our case did not show diffusion restriction on the ADC map despite having a solid tumor component showing hyperintensity on DWI b

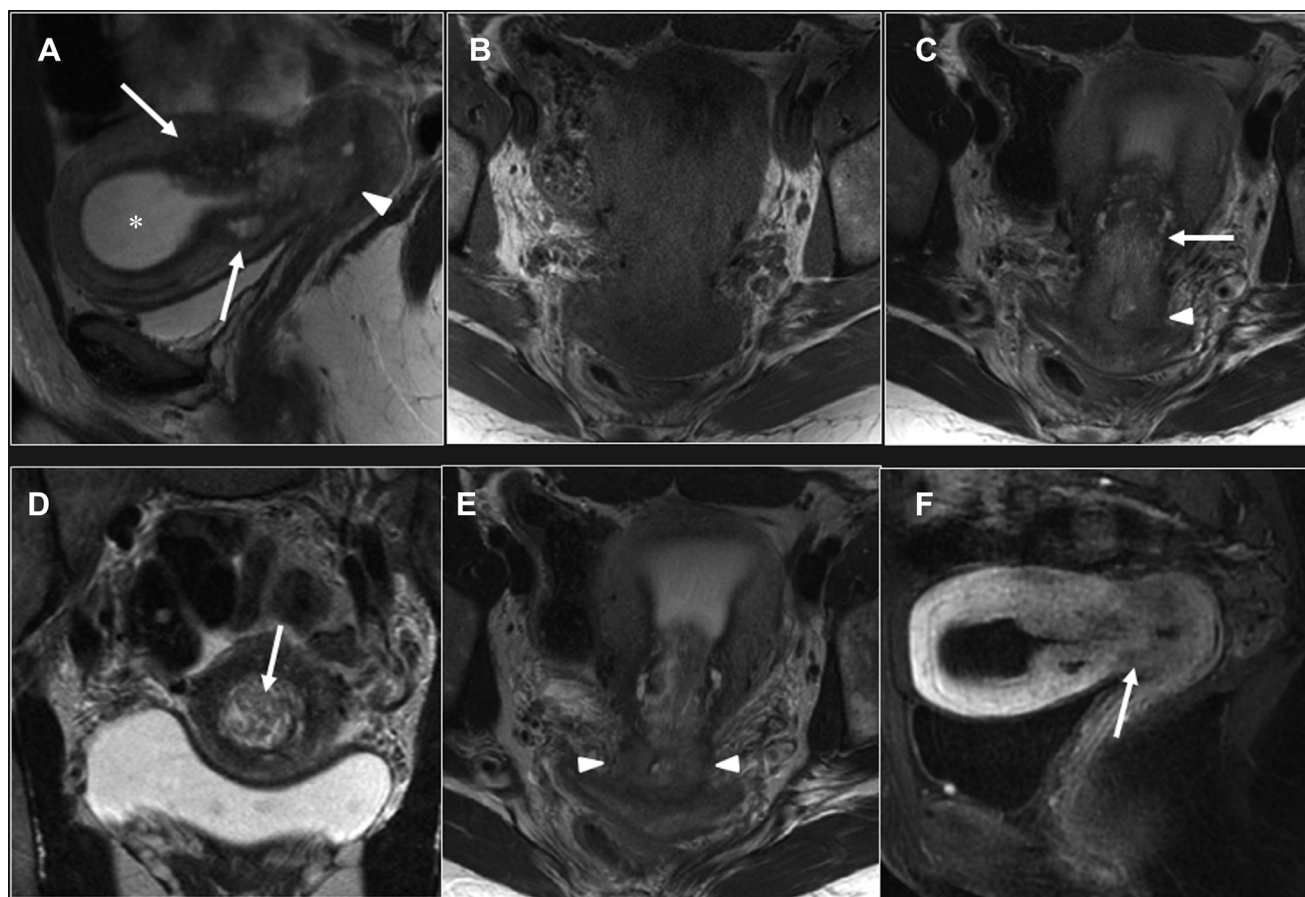


Fig. 2 – Pelvic MRI. Sagittal T2-weighted image (A) shows a cervical tumor that extends into the superior third of the vagina (arrowhead) and lower third of the uterine body (arrows), resulting in a distended endometrial cavity with retained liquid (*). Axial T1-weighted image (B) demonstrates expansion of the uterine cervix secondary to an isointense mass. Axial T2-weighted image (C) and oblique axial T2-weighted image perpendicular to endocervical canal (D) showing heterogeneous cervical mass with cystic (arrows) and solid (arrowhead) component. Axial T2-weighted image (E) shows disruption of the low-signal cervical stroma ring, bilateral invasion of the parametrium (arrows). Sagittal postcontrast T1-weighted with fat saturation image (F) shows enhancing cervix from the tumor (arrow).

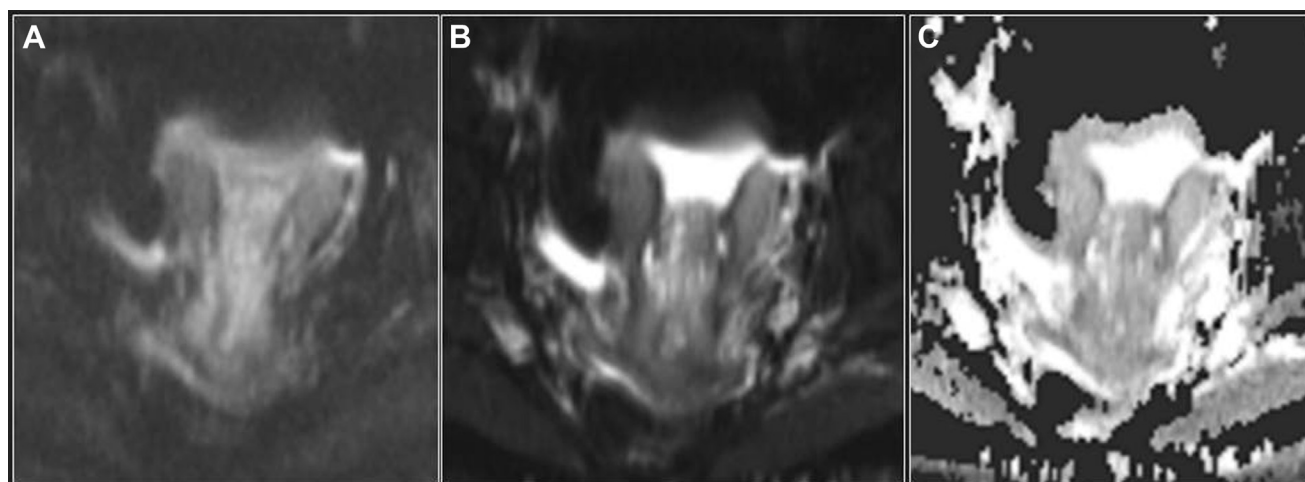
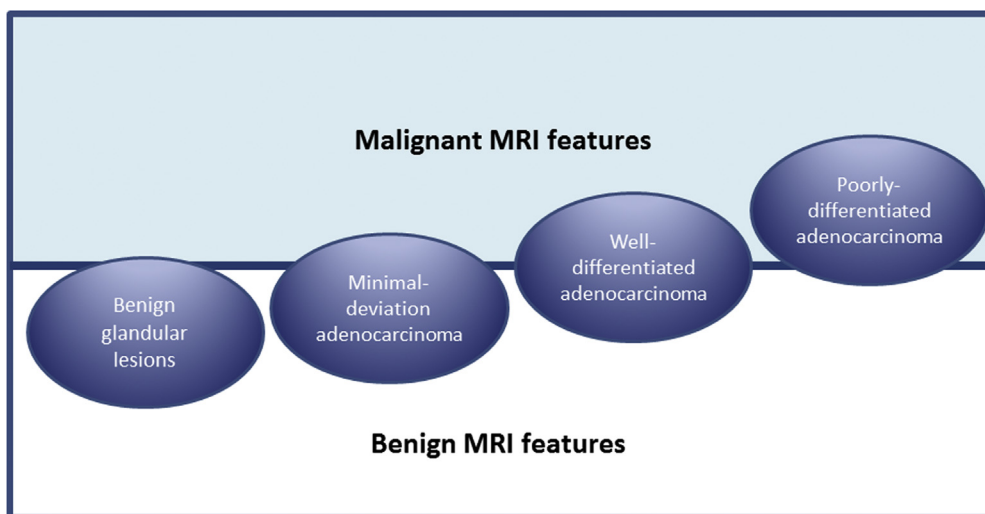


Fig. 3 – Pelvic MRI. Axial b 800 DW image (A) and axial b 0 DW image (B). Cervical lesion with high-signal intensity in A. Apparent diffusion coefficient map (C) shows no restriction.



Fig. 4 – The Photograph of the gross specimen removed via hysterectomy (A) shows a solid mass (T) within the diffuse enlarged uterine cervix and involvement of the lower third of the uterine body (arrow). Microphotograph (B) shows multicystic lesions composed of a single layer of columnar cells that resemble normal endocervical glands. However, most glands have an irregular shape, cellular atypia, and structural dysplasia with multiple lobulations (H&E stain, original magnification $\times 10$).



Malignant MRI features: Solid component on T2WI, stromal invasion on T2WI, restriction on DWI
 Benign MRI features: Cystic component, absence of stromal invasion, absence of restriction on DWI

Fig. 5 – A diagram showing continuous spectrum of multicystic uterine cervical lesions based on the amount of solid component, the degree of invasion of the cervical stroma, and the restriction or absence of restriction on DWI.

800. AM can be considered part of the continuous spectrum from hyperplasia to high-grade malignancy of multicystic uterine cervical lesions [8]. Multicystic cervical lesions are classified within the lesion spectrum based on the amount of solid component, the degree of atypia and cellular activity, and the degree of invasion of the cervical stroma (Fig. 5). In our case, the absence of restriction would be explained by the low-grade atypia and low mitotic activity found by histology. This finding is consistent with the proper correlation between DWI and histopathology of the tumor.

A multicystic lesion that invades the deep cervical stroma and contains solid components in T2WI may suggest a malignant tumor. In contrast, benign cystic lesions usually do not invade deeply into the cervical stroma and do not contain solid components. However, as it is shown in Figure 5, in some cases, the imaging findings of malignancy can overlap with those of benign cervical lesions [8], and other malignant tumors such as well differentiated adenocarcinomas with very low cellularity can also have high ADC values [4] as in benign cervical lesions.

Benign glandular lesions, such as endocervicitis, tunnel cluster, deep endocervical glands, deep Nabothian cysts, endocervical hyperplasia, metaplasias, endometriosis, and infectious and reactive atypias can mimic AM [9]. Furthermore, pathologic differentiation between AM and these pseudoneoplastic glandular lesions might be difficult because the histopathologic features of AM are very similar to those of the mucous glands of the normal cervical mucosa. In addition, a minimal degree of cellular atypia and mitoses can also be found in pseudoneoplastic glandular lesions.

Immunohistochemical examination can be helpful in the differential diagnosis of multicystic cervical lesions. HIK-1083 and CEA recognize the mucous cells of the gastric glands. These antibodies demonstrate positive cytoplasmic staining in AM tumor glands and negative in normal glands. Utsugi et al. [10] reported that in 90% of AM patients, HIK-1083 was positive, compared with only 30% of patients with conventional cervical adenocarcinoma. We must consider that immunohistochemical staining with CEA and HIK-1083 supports the diagnosis of AM, but a negative result does not exclude its diagnosis.

The contribution of this case is that it evaluates the imaging findings and the utility of DWI and ADC value in the diagnosis of AM.

In conclusion, although DWI findings are unspecific, in our case the combination of radiological findings (solid, cystic and invasive lesion without restriction on the ADC map) was highly suggestive of AM rather than the more typical carcinoma of the cervix, which normally shows restricted diffusion [11,12].

Conclusions

- (1) AM is a rare subtype of cervical adenocarcinoma which is included in a continuous spectrum of multicystic cervical lesions ranging from benign to malignant tumors.
- (2) MRI findings that may indicate AM are cervical stromal invasion and the presence of a solid component, although they are not pathognomonic.
- (3) There is not a specific DWI finding indicative of AM, but it can help to differentiate AM from conventional carcinoma of cervix if T2-weighted images show multicystic areas and there is no restriction on the ADC map.

REFERENCES

- [1] Gusserow ALS. Ueber sarcoma des uterus. *Arch Gynakol* 1870;1:240–51.
- [2] Silverberg SG, Hurt WG. Minimal deviation adenocarcinoma (“adenoma malignum”) of the cervix: a reappraisal. *Am J Obstet Gynecol* 1975;121(7):971–5.
- [3] Tavassoli FA, Devilee P, editors. World Health Organization Classification of Tumours, Tumour of the Breast and Female Genital Organs. Lyon: IARC Press; 2003.
- [4] Nougaret S, Tirumani SH, Addley H, Pandey H, Sala E, Reinhold C. Pearls and pitfalls in MRI of gynecologic malignancy with diffusion-weighted technique. *AJR Am J Roentgenol* 2013;200(2):261–76.
- [5] Sugiyama K, Takehara Y. MR findings of pseudoneoplastic lesions in the uterine cervix mimicking adenoma malignum. *Br J Radiol* 2007;80(959):878–83.
- [6] Li G, Jiang W, Gui S, Xu C. Minimal deviation adenocarcinoma of the uterine cervix. *Int J Gynaecol Obstet* 2010;110(2):89–92.
- [7] Okamoto Y, Tanaka YO, Nishida M, Tsunoda H, Yoshikawa H. Pelvic imaging: multicystic uterine cervical lesions. Can magnetic resonance imaging differentiate benignancy from malignancy? *Acta Radiol* 2004;45(1):102–8.
- [8] Bin Park S, Lee JH, Lee YH, Song MJ, Choi HJ. Multilocular cystic lesions in the uterine cervix: broad spectrum of imaging features and pathologic correlation. *AJR Am J Roentgenol* 2010;195(2):517–23.
- [9] Young RH, Clement PB. Pseudoneoplastic glandular lesions of the uterine cervix. *Semin Diagn Pathol* 1991;8(4):234–49.
- [10] Utsugi K, Hirai Y, Takeshima N, Akiyama F, Sakurai S, Hasumi K. Utility of the monoclonal antibody HIK1083 in the diagnosis of adenoma malignum of the uterine cervix. *Gynecol Oncol* 1999;75(3):345–8.
- [11] Demirbaş T, Cimilli T, Bayramoğlu S, Güner NT, Hocaoğlu E, İnci E. Contribution of diffusion-weighted imaging to diagnosis and staging of cervical cancer. *Balkan Med J* 2014;31(2):154–7.
- [12] Liu Y, Ye Z, Sun H, Bai R. Clinical application of diffusion-weighted magnetic resonance imaging in uterine cervical cancer. *Int J Gynecol Cancer* 2015;25(6):1073–8.