Abdominal wall endometriosis: MRI features about 31 lesions with histological confirmation

Poster No.: C-1798
Congress: ECR 2014
Type: Scientific Exhibit
Authors: M. Franz, T. Klotz, P. F. Montoriol, J. M. Garcier, M. Canis, D. Daines; Clermont-Ferrand/FR
Keywords: Pathology, Diagnostic procedure, CT, Ultrasound, MR, Pelvis, Musculoskeletal soft tissue
DOI: 10.1594/ecr2014/C-1798

Any information contained in this pdf file is automatically generated from digital material submitted to EPOS by third parties in the form of scientific presentations. References to any names, marks, products, or services of third parties or hypertext links to third-party sites or information are provided solely as a convenience to you and do not in any way constitute or imply ECR’s endorsement, sponsorship or recommendation of the third party, information, product or service. ECR is not responsible for the content of these pages and does not make any representations regarding the content or accuracy of material in this file. As per copyright regulations, any unauthorised use of the material or parts thereof as well as commercial reproduction or multiple distribution by any traditional or electronically based reproduction/publication method is strictly prohibited. You agree to defend, indemnify, and hold ECR harmless from and against any and all claims, damages, costs, and expenses, including attorneys’ fees, arising from or related to your use of these pages. Please note: Links to movies, ppt slideshows and any other multimedia files are not available in the pdf version of presentations.
www.myESR.org
Aims and objectives

Abdominal Wall Endometriosis (AWE) is defined as superficial endometriosis lesions located on the parietal peritoneal layers, muscles and subcutaneous tissues of the abdominal wall.

It usually arises on a surgical scar of caesarean section or hysterectomy, less frequently in a surgical scar of hernia or appendectomy and, rarely, without surgical past history.

It represents 1-4% of all endometriosis lesions.

Patients usually complain of an abdominal wall mass near a surgical scar, with cyclic pain. But, few patients are totally asymptomatic.

Therefore, the radiologist has a key role to confirm a clinical suspicion of AWE or to establish this diagnosis of an abdominal parietal mass.

MRI features of AWE have only been described in small series, and most of the time without any confrontation with pathological findings.

The purpose of our study was to evaluate the MRI features of pathologically-confirmed AWE.
Methods and materials

This retrospective study was approved by institutional review board with waiver of informed consent.

Twenty-eight women with 31 lesions of AWE surgically treated and histologically confirmed who underwent MRI examination on 1.5-T units in our hospital between May 2004 and February 2013 were included.

MR analysis evaluated tumor location (soft tissues, umbilicus, round ligament, aponevrosis, intramuscular in the external oblique or in the rectus abdominis), contours (ill-defined, irregular, regular), largest dimension and signal intensities on fast spin-echo T2-weighted images (T2), spin-echo T1-weighted images without (T1) and with fat suppression (T1 FS).

On both, T2, T1 and T1 FS sequences, the lesions were described as hypointense or isointense if they were homogeneously hypo- or isointense compared to the abdominal wall muscles. The lesions were described as hyperintense if they were homogenously or partially (spots) hyperintense.

Enhancement was assess in 13 cases by comparing T1 FS sequences before and after gadolinium contrast injection (T1 FS Gado).

Diffusion-Weighted (DW) (b values 0 and 800s/mm²) results were based in 4 cases on the apparent diffusion coefficient (ADC) values.

Sonographic examination was perfomed in 13 cases using a 9-MHz linear-array transducer. Contours (ill-defined, irregular, regular), echogenicity (compared to abdominal wall muscles) and existence of color doppler signal inside the lesion were assessed.

On CT, perfomed in 2 patients, contours (ill-defined, irregular, regular), density (compared to abdominal wall muscles) and enhancement (superior to 10UH) were noted.

All images were reviewed in consensus by experienced radiologists (D.D, PF.M, T.K) in woman imaging.

Due to the group size, all data was analysed from a descriptive point of view.
Results

The main clinical findings are summarized in Table 1 on page 6, alongside data from the two largest literature meta-analyses.

Mean age at symptoms appearance was 33.9 years (ranging from 22 to 47 years). Mean delay between surgery and symptoms appearance was 5.0 years ranging from 0 (for three patients, caesarean scar in all cases) to 15.3 years.

Most patients presented abdominal wall mass (53%) and pain (89%) with cyclic evolution (60%). 11% didn't complain of any abdominal wall symptoms and underwent MRI to assess for deep pelvic endometriosis.

Associated intra-abdominal endometriosis concerned 9 patients (32%), with respectively caesarean scar involved and no scar involved in 55% (n=5) and 33% (n=3) of cases (and other scar involved for one patient).

4 patients (14%) had no scar involved (1 umbilicus lesion, 2 round ligaments lesions (Fig. 1 on page 6) and 1 external oblique lesion) and 3 of them had associated deep pelvic endometriosis (75% of patients with no scar involved).

The great majority (89%) had a unique abdominal wall lesion (three patients presented two lesions).

Mean size lesions was 2.4cm (ranging from 1.0 to 4.7cm).

The most common location was rectus abdominis (48%). Then, lesions were located on soft tissues (19%), aponevrosis (16%), external oblique muscle (6%), round ligament (6%) and umbilicus (3%).

MR imaging features were shown in Table 2 on page 7.

Typical appearance was hyperintense on T2 (64%), iso or hyperintense on T1 (46 and 54% respectively) and hyperintense on T1 FS (92%) (Fig. 2 on page 8). Strong enhancement (84%) was shown on T1 FS Gado (Fig. 3 on page 9). Mean ADC value was $1.25 \times 10^{-3} \text{mm}^2/\text{s}$.

Contours were usually irregular (48%) (Fig. 3 on page 9) but regular contours were not uncommon (32%).
On sonography, all lesions were hypoechoic (Fig. 1 on page 6). 77% (n=10) had irregular contours, 23% (n=3) regular contours and no ill-defined lesion. Among the 11 with doppler study, 73% (n=8) showed doppler signal inside the lesion.

On CT, the two lesions were ill-defined, isodense and with slight enhancement after iodine contrast injection (Fig. 4 on page 9).
### Table 1: Clinical findings

© Imagerie Médicale, CHU Estaing - Clermont-Ferrand/FR
Fig. 1: AWE located on right round ligament (arrow) in patient without surgical scar. Lesion was on isosignal T2 (A), isosignal T1 (B) and showed spots on hypersignal T1 FS (C). On sonography, lesion appeared hypoechoic and irregular contours (D).

© Imagerie Médicale, CHU Estaing - Clermont-Ferrand/FR
Table 2: MR imaging features

© Imagerie Médicale, CHU Estaing - Clermont-Ferrand/FR
Fig. 2: AWE located on rectus abdominis and developed on caesarean scar. Lesion with hemorrhagic cystic component (black arrow) and nodular component (white arrow) which both shown hyperintensity on T2 with T2-shading and peripheral hypointense T2 ring (A), hyperintensity on T1 (B) and T1 FS images (C). Sonographic image showed the cystic component without doppler color inside (D).

© Imagerie Médicale, CHU Estaing - Clermont-Ferrand/FR

Fig. 3: AWE located on rectus abdomens and developed on caesarean scar. Compared to prior T1 FS image (A), T1 FS Gado image (B) showed a strong enhancement of the AWE lesion (arrow), similar to those of uterine muscle.

© Imagerie Médicale, CHU Estaing - Clermont-Ferrand/FR
**Fig. 4:** AWE located on aponevrosis developed on caesarean scar. On CT, lesion showed slight enhancement after iodine injection and ill-defined contours.

© Imagerie Médicale, CHU Estaing - Clermont-Ferrand/FR
Conclusion

In this study, we correlated MR imaging, sonographic and CT features and AWE with histological confirmation.

AWE lesions were almost unique, located virtually anywhere on the abdominal wall, from intramuscular to soft tissues. The most frequent anatomic structure hit the rectus abdominis.

Location could be divided in two groups: on one hand, soft tissue, aponevrotic or muscular involvement (rectus abdominis or external oblique) are related with surgical scar section (surgical deposits theory); on the other hand, round ligament and umbilicus involvement occur with no past surgical history but with associated pelvic endometriosis (implantation theory).

At MR, typical appearance was a iso- to hyperintensity on T2, isointensity on T1, and hyperintense spots on T1 FS series on almost all lesions.

Most lesions were irregular or ill-defined, traducing the infiltrative character of AWE.

Strong enhancement after gadolinium contrast injection was frequent.

Diffusion showed a mean ADC value of $1.25 \times 10^{-3}$ mm$^2$/s, opposed to the value found in literature of $0.93 \times 10^{-3}$ mm$^2$/s (ranging from 0.79 to 1.10). DW didn't seem to be reliable and helpful in MR assessment of AWE, probably because of magnetic field heterogeneity induced by blood deposits and because of a major fibrous component at pathology.

Sonography evaluation of AWE typically showed a heterogenous irregular hypoechoic lesion with internal vascularisation, in literature and in our study.

At CT, the AWE lesions were typically ill-defined nodules isodense to the muscle, with slight enhancement after iodine contrast injection.

Our study was limited by its retrospective design and could be completed by a prospective study to assess MRI performance in AWE diagnosis compared to pathology findings.

This work, the largest MR imaging series yet with pathologic proof of AWE, showed the prime value of MRI when looking for AWE, especially based on the hyperintense T1 FS spots inside a single irregular lesion isointense on T1 and hyperintense on T2.
References