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Prevalence of adenomyosis in women undergoing surgery for endometriosis

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ABSTRACT

Objective(s): To evaluate the prevalence of adenomyosis in patients undergoing surgery for endometriosis.
Study design: Retrospective study including 1618 women with preoperative clinical and ultrasound diagnosis of endometriosis. As preoperative assessment, all patients underwent ultrasound to assess endometriosis and all features associated with adenomyosis (heterogeneous myometrial echotexture, globular-appearing uterus, asymmetrical thickness of anteroposterior wall of the myometrium, subendometrial myometrial cysts, subendometrial echogenic linear striations or poor definition of the endometrial–myometrial junction).
Results: Adenomyosis was present in 353/1618 (21.8%) women included in the study. Multivariate analysis showed that the prevalence of adenomyosis was significantly associated with deep infiltrating endometriosis, parity, dysmenorrhea intensity and women's age ($P < 0.0001$).
Conclusion(s): Adenomyosis is a common condition but its aetiology and natural history are still unknown. Our experience showed a 21.8% of prevalence of adenomyosis in patients affected by endometriosis and its association with parous women, increasing age, dysmenorrhea intensity and with the presence of deep infiltrating endometriosis.

Introduction

Adenomyosis is a benign condition of the uterus, defined by the presence of endometrial glands and stroma within the myometrium. It is a difficult diagnosis, often established only at pathological examination of the hysterectomy specimen. Previous studies of occurrence of adenomyosis have been limited to women who underwent hysterectomy, which is likely to overestimate its prevalence [1–3]. In view of this, there are few published data on the prevalence of adenomyosis, both in the general population of women and in patients affected by endometriosis. Recently, different non-invasive techniques have been described which enable the clinician to diagnose adenomyosis prior to any treatment. Particularly, improvements in the resolution of transvaginal ultrasonography (TVS) have enabled a more detailed assessment of uterine architecture [4]. The TVS criteria of adenomyosis involve alterations in the myometrium, such as heterogeneous myometrial echotexture, globular-appearing uterus, asymmetrical thickness of the myometrium anteroposterior wall, subendometrial myometrial cysts, subendometrial echogenic linear striations or poor definition of the endometrial–myometrial junction [5,6].

Higher frequencies (5–7 MHz) reduce artefacts while improving spatial resolution, making ultrasound invaluable in the diagnosis and follow-up of the most gynaecological disorders [7]. Moreover, TVS is inexpensive, readily available and well tolerated compared to magnetic resonance imaging (MRI). Several studies have shown MRI to be highly accurate in the diagnosis of uterine adenomyosis, with sensitivity and specificity ranging from 86% to 100% in a symptomatic patient population [8], but the high cost and limited availability of MRI make it an impractical tool for the initial evaluation of patients with non-specific gynaecological complaints suggestive of adenomyosis.

Nowadays there is a growing interest on adenomyosis, which seems be associated with endometriosis pathology [9]. It is known as a histological diagnosis but it is a clinical entity showing symptoms (dysmenorrhea, dyspareunia, abnormal uterine bleeding and infertility) and according to some authors it seems to share

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pathogenic mechanisms with endometriosis [10]., Due to the accuracy and recent high resolution of ultrasound we decided to diagnose adenomyosis according to the ultrasonography criteria as previous described [5,6] and we evaluated the prevalence of adenomyosis in patients undergoing surgery for endometriosis. In some patients pain is not responsive to surgical excision of endometriosis and recurrence of symptoms is present despite the radicality of the procedure. The value of knowing the prevalence of adenomyosis in a population undergoing endometriosis surgery is in evaluating how many of the women are likely to have adenomyosis contributing to their pain symptoms as well as any endometriosis seen at laparoscopy.

Materials and methods

Design and patients

For this retrospective study, ethical approval was obtained from the local ethics committee (198/2013/O/OssN). From January 2010 to December 2012, in the Minimally Invasive Gynecological Surgery Unit of the Department of Gynecology, S. Orsola-Malpighi Hospital, University of Bologna, women with preoperative clinical and ultrasound diagnosis of endometriosis who underwent surgery for endometriosis were enrolled. Clinical evaluation included physical examination of the pelvis, and inspection and palpation of the abdomen.

Findings predictive of the presence and localization of pelvic endometriosis found during clinical examination were: induration and/or nodules in the vaginal fornix or visible vaginal nodule in case of deep endometriosis, and in case of ovarian endometrioma the detection of adnexal masses. Histological confirmation of endometriosis was considered an inclusion criterion. Patients were divided according to the type of endometriosis–superficial, ovarian and deep infiltrating endometriosis (DIE). If more than one condition was found, we considered the more advanced disease to classify women into the three different type of endometriosis. We excluded women who previously undergone a hysterectomy, pregnant women, those with malignant gynaecological disease and those who received hormonal therapy (gonadotrophin-relasing hormone agonist and levonorgestrel intrauterine system) in the preceding 3 months before surgery. For all women, demographic and clinical data (age, body mass index (BMI), parity and subsequent dysmenorrhea, dyspareunia, dyschezia, dysuria and abnormal uterine bleeding) were recorded prior to undergoing ultrasound scan. The level of patient's pain was evaluated by the visual analogue scale (VAS) system, utilizing a 10-cm line with the extreme points 0 and 10 corresponding to "no pain" and "maximum pain". Moreover, women were asked about frequency and duration of menstrual periods. Abnormal uterine bleeding was assessed by asking whether they felt their periods were excessively heavy or not.

A transvaginal ultrasound scan was then done before surgery by a single operator (G.M.) and other diagnostic tests, such as MRI and computed tomography (CT), were performed when indicated to evaluate the presence, the localization and the extension of endometriosis lesions.

Sonographic examinations were performed in a systematic manner, using a high-quality ultrasound machine (Voluson S8, GE Milwaukee, WI, USA) equipped with a transvaginal wide-band 5.0–9.0-MHz transducer, which ensured a consistent approach to data collection and ultrasound examination. First, the uterus was examined in the longitudinal plane to identify the endometrium. The probe was then rotated 90° anticlockwise and the cervical canal and uterine cavity were visualized in the transverse plane. The myometrium was systematically examined for the sonographic features associated with adenomyosis. Diagnosis of adenomyosis was made when 3 or more of the following sonographic features were present: heterogeneous myometrial echotexture (presence of an indistinctly myometrial area with decreased or increased echogenicity), globular-appearing uterus, asymmetrical thickness of antero-posterior wall of the myometrium, subendometrial myometrial cysts (round anechoic areas of 1–7 mm diameter), subendometrial echogenic linear striations (radiate pattern of thin acoustic shadowing not arising from echogenic foci) or poor definition of the endometrial–myometrial junction, according to previous studies [11–13].

In addition, an ultrasound diagnosis of endometriosis was made when ovarian endometriomas or endometriotic nodules were visualized. Ovarian cysts were classified as endometriomas when they appeared as well-circumscribed thick-walled cysts that contained homogeneous low-level internal echoes ('ground glass'). Endometriotic nodules were typically visualized as stellate hypoechoic or isoechogenic solid masses with irregular outer margins. DIE nodules, such as utero-sacral ligament (USL), bowel, recto-vaginal, vaginal and bladder involvements were investigated as described below [14–17]. The USL nodule produces a discrete sheet-like or stellate hypoechoic image with irregular outer margins, usually located in close proximity to the uterine cervix. Bowel endometriosis is a hypoechoic fixed nodule behind the cervix, attached to the bowel wall. The external margins of the nodule are hyperechoic due to the presence of congested adipose tissue, submucosa and mucosa. The vagina and recto-vaginal septum are considered to be involved when its wall is thickened or when a nodule with an irregular outer contour and spiculations is seen attached to it. Finally, diagnostic criteria suggestive of bladder endometriotic nodule include the presence of a hypo- or iso-echogenic nodule within the bladder wall and the presence of a nodule with heterogeneous echostructure containing numerous anechoic ('bubble-like') areas. [14–17].

Statistical analysis

Initially, a descriptive analysis was done, including frequency distribution for qualitative variables, and calculation of mean and standard deviation for quantitative variables. Univariate and multiple logistic regression analyses were used to identify the independent factors associated with the presence of adenomyosis. On each regression analysis, all factors including age, BMI, parity, endometriosis localization and related symptoms were entered into the logistic regression model. Multiple logistic regression analysis was performed using Wald $P < 0.05$ for variable entry and $P > 0.1$ for its removal. An effect was deemed statistically significant at 0.05. Odds ratios (OR) were calculated with 95% confidence intervals (CI). Kappa coefficient was calculated to determine the level of agreement between ultrasound and histological diagnosis of adenomyosis. All analysis was performed with the software SPSS 11.0 software (SPSS inc., Chicago IL, USA)

Results

Demographic and clinical characteristics of women included in the study are summarized in Table 1. A total of 1644 women with preoperative clinical and ultrasound diagnosis of endometriosis who underwent surgery for endometriosis were enrolled. Of the 1644 women, 26 were excluded from the data analysis as 21 patients had no histological diagnosis of endometriosis and 5 had previously undergone a hysterectomy. Patients underwent laparoscopic excision of endometriotic lesions, as shown in Table 2, and 25 women underwent hysterectomy. Of these women, 15 did so for pain symptoms, 9 for prolapse and 1 for urinary symptoms. The sensitivity and specificity of ultrasound in diagnosing adenomyosis was 94.0% and 71.3%, respectively. The positive predictive value