PERSPECTIVE

Is it time to change the ASRM classification for endometriosis lesions? Proposal for a functional FOATIaRVS classification

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Abstract A new FOATIaRVS (Foci–Ovarian endometrioma–Adhesion–Tubal endometriosis–Inflammation–adenomyosis–Recto Vaginal Space) endometriosis classification is proposed to replace the ASRM (American Society Reproductive Medicine) classification. FOATIaRVS is descriptive, complete, precise, simple and easy-to-use. All endometriotic implants are described through the use of a formula. The attribution of coefficients for each endometriotic site is very simple: 0, 1 or 2. A coefficient of 2 is attributed if the lesion is substantial and could cause infertility or pain. The description of the endometriosis covers not only the usual appearance of the implants but also their functional repercussion for tubal and ovarian function. It also includes results of the most recently developed explorations. The formula is clearly of value for providing information on the progression or the regression of each endometriotic site and on the efficacy of the therapy for each location. It has a predictive value and can provide indications for the choice of therapy.

As everyone acknowledges, the ASRM classification has been very successful and adopted throughout the world. It had the great advantage of distinguishing between mild and severe forms of the disease, providing benefits that are not found with other classifications available at the time. Today, after much meandering, we have arrived at a situation in which explorations of endometriosis involve diverse techniques, giving more complete and accurate findings, largely due to progress in ultrasound and magnetic resonance imaging (MRI).

These two techniques provide essential information, particularly for deep infiltrating lesions and for adenomyosis, for which laparoscopy is not entirely satisfactory. These methods are now used by all specialist teams and form an integral part of pretreatment evaluations.

It is now clear that the ASRM classification, which is based essentially on laparoscopy findings, no longer corresponds to the reality of everyday practice in this field. Surely, it is now time to reconsider the use of this classification.

We propose a classification based on functional criteria, incorporating inputs from all methods of investigation. This classification also has the advantages of specifying the degree of severity for each type of lesion, providing support for decisions on treatment and facilitating analyses of the effects of

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treatments on each location. The FOATI (Foci–Ovarian endometrioma–Adhesion–Tubal endometriosis–Inflammation) classification was first developed by the French Endometriosis Study Group (GEE) in 1994 and has then been revised since 2010, it becomes FOATIaRVS (Foci–Ovarian endometrioma–Adhesion–Tubal endometriosis–Inflammation–adenomyosis–Recto Vaginal Space endometriosis)

The various classifications for endometriosis

Many different attempts for classification were made before that of the ASRM: Wicks and Larson in 1949 [1], Huffman in 1951 [2], Acosta in 1973 [3], Mitchell and Farber in 1974 [4], Kistner in 1977 [5] and Buttram in 1978 [6]. In 1978, the committee of the AFS (the American Fertility Society), which consisted of Buttram, Behrman and Kistner, developed the AFS classification [7]. In 1985, this committee proposed a revised AFS classification [8], which was adopted in many countries. In 1996, the classification committee of the ASRM (the American Society for Reproductive Medicine) added to the revised classification a description of the appearance of peritoneal implants: red, white, blue, black and resorbtion defects, annotated with the corresponding percentages [9]: this is the classification currently in use . Further classifications were described by Adamyan L. [10], Chapron C. [11], Enzian [12]. Koninckx et al. [13] also recently suggested that a new classification would allow to evaluate the actual uncertainties in order to built subsequently a validated classification.

The ASRM classification provides a complete repertoire of endometriotic implants. However, tubal and extragenital factors are considered merely as additional factors. This classification is illustrated by examples of the diagrams of the disease at various stages: minimal (score of 1 to 5), mild [6–15], moderate (16 to 40) and severe (>40).

The major problem with this classification is the entirely arbitrary attribution of points to obtain a total score. The authors of the 1996 revision admitted that the descriptive value of the classification might have been lost [9]. Very different lesions may be classified as the same stage. For example, a patient with stage III disease and a score of 26 points may present lesions of the ovary and Douglas pouch, whereas another patient with stage III disease and a score of 29 points may have mostly adhesions and tubal lesions. These two women may not have the same fertility problems or pain, but their endometriosis is nonetheless considered to be at the same stage under this classification. Similarly, patients with stage IV disease and a score of 51 points tend to have tubal lesions and adhesions, whereas patients with stage IV disease and a score of 114 points seem to present a higher frequency of deep infiltrating lesions. It is therefore

not particularly surprising that the various publications report discordant results for treatment, because they may include patients with very different characteristics, despite being classified as having disease of the same stage. The total score is thus too simplistic to provide a precise description of the implants. The ASRM classification is based solely on visual observations during laparotomy or laparoscopy. It does not take into account the results of more recently developed explorations, such as ultrasounds, MRI, hormonal determinations (serum levels of AMH: anti-Mullerian hormone) or biological markers. Finally, factors with undoubted prognostic value, such as tubal obstruction, a decrease in the functional value of the ovary, multivisceral involvement and implantation in the rectovaginal space, cannot be exploited in the total score, which therefore has no clear prognostic value [14].

Recently Adamson G.D. [15] proposes an Endometriosis Fertility Index with the objective to develop a clinical tool that predicts pregnancy rate in patients with surgically documented endometriosis attempting non-IVF conception.

The FOATIaRVS classification of the GEE

Given the lack of precision of the AFS classification, the GEE decided to develop its own classification, the FOATI classification, in 1991–1992. The classification committee, which was set up in 1988, comprised J.L. Leroy, M. Mintz, D. Querleu, C. Racinet, D.K. Tran, R. Trevoux and was presided by C. Sureau. The first publications relating to this classification date from 1994 [16]. It was presented at the Fifth World Congress on Endometriosis in 1996, by J. Belaisch and D.K. Tran [17]. Most of the participants at this congress (who were asked to give their opinion by show of hands) considered this classification to be of considerable interest and worthy of international study. The classification was subsequently revised between 2005 and 2010, resulting in its simplification and in the inclusion of results for recently developed explorations. The revision committee consisted of J. Belaisch, A. Bongain, C. Jardon, J.L. Leroy and D.K. Tran. They elaborated the FOATI-RVS classification. A group of Vietnamese gynaecologists joined this committee in 2010: Nguyen Thi Ngoc Phuong, Nguyen Ba My Nhi and Au Nhat Luan. They recommended the addition of the factor a=adenomyosis. The classification then became FOATIaRVS, which is more simple and complete. Recently, I. BROSENS participated to this revision.

What are the objectives of the FOATIaRVS classification?

The objectives are to propose a descriptive, complete, precise but simple and easy-to-use classification which is

absolutely essential for the many teams working on this problem to be able compare their observations objectively and above all compare the results obtained with various treatments in a precise manner.

What are the particular features of the FOATI classification?

Complete description of the endometriotic implants, through the use of a formula: F.O.A.T.I.a.RVS. which replaces the total score F.=Foci, superficial peritoneal implants; O.= ovarian endometrioma (chocolate cyst; the lesions on the surface of the ovary resemble superficial peritoneal implantations); A.=adhesions; T.=lesions of the tubal wall (the lesions of the serosa resemble also superficial peritoneal implants); I.=inflammatory appearance; a= adenomyosis; RVS.=involvement of the rectovaginal space.

Simplicity of the attribution of coefficients For each of these elements, a simple coefficient is attributed: 0–1–2. In the absence of a lesion at the site concerned, the coefficient is 0. If the lesion is very substantial and could account for infertility or pain on its own, a coefficient of 2 is attributed. A coefficient of 1 indicates the presence of endometriosis at the site concerned, but without the lesion being either major or determinant.

Use of all recently developed explorations The designation of a coefficient of 2 is based on the functional consequences of lesions, ultrasound and MRI data, determination of the ovarian reserve and, possibly, of biological markers.

Thus A2 indicates the presence of very dense adhesions leading to a loss of mobility of the tubes and the ovaries: in this classification, more attention is paid to functional effects than to the extent of the adhesions. T2 indicates total, bilateral tubal obstruction. A2 or T2 is sufficient in itself to account for infertility.

How large does an ovarian chocolate cyst need to be to affect the ovarian function? (coefficient of 2): 6 cm according to the CNGOF (*Collège national des Gynécologues et Obstétriciens Français* : the French National College of Gynaecologists and Obstetricians), 7 cm according to Arika Fujishita, the author of the TOP classification for endometriosis [18]. In reality, it is not only the size of the chocolate cyst, but also its repercussions for the ovarian reserve that should be considered. The ovarian reserve is evaluated by determining serum levels of AMH and counting the remaining antral follicles on ultrasound scans. O2 corresponds to a chocolate cyst of more than 6 cm in diameter, the deficit of the ovarian reserve being a cause for alarm.

F2 designates a cumulative diameter of more than 6 cm for superficial peritoneal lesions. However, more important than this cumulative diameter is the inflammation resulting from the extent of the superficial peritoneal lesions, which disturbs reproductive function.

I (inflammation) is thus a factor to be taken into account in endometriosis. It is scored "+"or "−". I is scored "+" in cases of red hypervascularised lesions displaying exudation. Inflammation may also be assessed by checking for the presence of inflammatory cells in biopsy specimens. It probably reflects the progressive potential of peritoneal lesions and may eventually serve as a source of biological markers of the progressiveness of endometriosis. Inflammation accounts for the high risk of adhesions following surgery carried out without prior medical treatment [19] [20]. Indeed, persistent infection and chronic inflammation have always been considered absolute but temporary contraindications for these types of surgery.

Adenomyosis (a) is detected by MRI and ultrasound scanning: 0=normal junctional zone; 1=abnormal junctional zone; 2=endometrium in outer myometrium (I. Brosens) [21]

Deep infiltrating endometriosis of the rectovaginal space (RVS) is, of course, assessed by vaginal and rectal examinations, but objective evaluations are now obtained essentially by MRI. RVS 1 corresponds to a spatially limited lesion; RVS 2 indicates extension to the neighbouring organs, with 2U indicating extension to the urinary organs, 2R indicating extension to the rectum and 2UR indicating extension to both urinary organs and the rectum. It is possible to add to the formula more details of urinary lesions (bladder, ureter, etc.). It is also possible to associate here Adamyan's suggestions, Chapron's classification or Enzian's classification which described deep infiltrating endometriosis.

An example of the formula could be $F^2 O^0 A^2 T^0 I + a^1 RVS^2$

What are the advantages of this method?

The formula is very simple to write, but it provides a complete and analytical description of all the locations of endometriosis. This description covers not only the visual appearance of the implants, but also the functional repercussion of adhesions for tubal and ovarian function. It also includes the results of the most recently developed explorations: ultrasound scans, MRI, AMH determination for investigation of the ovarian reserve, histological analyses of biopsy specimens and, in the future, the determination of levels of biological markers of disease progression. The evaluation of disease severity (coefficient 2 for A, T, O, RVS and adenomyosis) is based not only on the size of the lesions, but also on their consequences in terms of fertility and pain.

By simply reading the formula, it is possible to obtain a precise description of each endometriotic implant at a precise moment in the life of the patient. Another formula resulting from investigations at another time would provide information about the progression of the disease: aggravation at certain locations, regression at others. A comparison of the formula obtained before and after treatment would provide a precise evaluation of the efficacy of the treatment at each location.

The formula can be continuously improved by addition of new factors like cancer classification. This formula is clearly of value for determining indications for treatment: A^2, T^2, RVS 1 and 2 and O^2 (without decline of the ovarian reserve) reveal anatomic distortions with an indication for immediate surgery. F^2 and I+ indicate a need for drug-based treatment before surgery [14, 15]. RVS^2 recommends multidisciplinary approach. A patient with a formula including F^2 I+ but without anatomic distortion could be treated solely with drugs. If there has clearly been a change in the ovarian reserve, it would not be necessary to operate (if no cancer suspicion is found), particularly as this would be likely to worsen the prognosis further. By contrast, patients in this situation need to be provided with rapid access to

in vitro fertilisation techniques, and even the freezing of oocytes.

A^2, T^2, O^2 and a^2 are factors associated with a poor prognosis in young women.

The computerised classification of formula is easier than that of diagrams. Comparisons between patients, even if they live on different continents, is thus easier, because large series of formulas can easier be sent by Internet than a large series of diagrams, which consume much more memory (the total score, as a number, is more easily exchanged, but has no descriptive value).

Conclusion

The ASRM classification is still universally used, but the FOATIaRVS classification is simpler to use and more descriptive. It has predictive value and can provide indications for the choice of therapy. A study carried out in several countries by specialised teams working together in a network should make it possible to confirm the results obtained in France and to determine whether this method of classification should be more widely used.

Endometriosis (FOATIa.RVS of the GEE)

LESIONS	0	1	2
F = (Foci –superficial peritoneum) =cumulated diameters	No lésion	1 – 6 cm	> 6 cm
O = Endometrioma (Mensuration by imagery).Ovarian Reserve by antral follicules count & AMH	No lésion	1 – 6 cm	> 6 or > 7 cm →Ovarian reserve decreased = alert
A = Adhesion = before adhesiolysis	No lésion	Incomplete preservation of the adnexal mobility	Lack of the adnexal mobility
T = Tube	No lesion	Incomplete tubal obstruction (distal or proximal):the best of 2 tubes	Permanent & complete occlusion of the 2 tubes
I = Inflammation	(-) = no inflammation	+ = hypervascularisation, peritoneal exsudation predominance of red lesions	+ = histological inflammatory tissue + = biological parameters ?
a = Adenomyosis (MRI)	(-) = normal junctional zone	Abnormal junctional zone	Endometrium in the outer myometrium
R.V.S. (Rectovaginal space)	No lésion	Lesion of the RVS	Lesion of the RVS + urinary = 2U + rectal = 2R +Urinary + Rectal = 2RU

Histology: F: + - x   O: + - x
A: + - x   T: + - x
I : + - x
R.V.S. : + - x

F. O. A. T. I. a.. RVS.

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