Technique of Cytoreductive Surgery in Patients with Myomas and Adenomyosis

George A Pistofidis
Structure of presentation

• What is adenomyosis-definition & etiology
• Myomas and adenomyosis
• Is adenomyosis a single disorder?
• How frequent & what age groups?
• Best way to make the diagnosis
• Laparoscopic technique for myomectomy
• Laparoscopic technique for adenomyomatectomy
• What are the dangers
• Conclusions
What is adenomyosis?

‘is the benign invasion of endometrium into the myometrium, producing a diffusely enlarged uterus which microscopically exhibits ectopic, non-neoplastic endometrial glands and stroma surrounded by hypertrophic and hyperplastic myometrium’

C Bird et al 1972 Am J O&G
Etiology of adenomyosis

• 1) Invagination of endometrial glands into the myometrium
• 2) Embryonically misplaced tot potential Mullerian remnants
• 3) Endometrium invaginates and proceeds along the myometrial lymphatics
• 4) Misplaced bone marrow stem cells displaced through the vasculature

L Garcia & K Isaacson 2011 Min Inv Gynecol
Is adenomyosis a single disorder?
It seems that endometriosis and adenomyosis are first degree relatives

- Endometriosis and adenomyosis share some common aetio-pathogenic mechanisms (genetic, environmental, immunological)

  *Apoptosis and bel-2 expression in normal human endometrium, endometriosis and adenomyosis*
  - Rebecca K Jones et al 1998

  *Distribution of cyclooxygenase-2 in eutopic and ectopic endometrium in endometriosis and adenomyosis*
  - Hirotaka Ota et al 2001

  *Oestrogen receptor alpha genes polymorphism is associated with endometriosis, adenomyosis and leiomyomata*
  - Jo Kitawaki et al 2001

  *Association between genetic polymorphisms in fibroblast growth factor (FGF)1 and FGF2 and risk of endometriosis and adenomyosis in Chinese women*
  - Shan Kang et al 2010

  *Is adenomyosis an immune disease?*
  - Hirotaka Ota et al 1998
In some publications, adenomyosis is found with endometriosis...

- The prevalence of adenomyosis in 160 women with endometriosis was 79%.
- And in women under the age of 34 with endometriosis 90%!

  G Kunz, D Beil, P Huppert et al. Hum Reprod 2005

- There is a high correlation of endometriosis and adenomyosis in first degree relatives.
- *Possibly both are phenotypes of a single disorder rather than two distinct diseases*

  S Kennedy, R Hadfield et al. Lancet 1998
Thus, adenomyosis similarly to endometriosis is a complex condition with multiple etiologies, and variable clinical expressions.
Laparoscopic myomectomy
Myomas, regardless of their position and size...
...are surrounded by a clear anatomical plane, the pseudo-capsule
The vasculature is peripherally arranged around the myomatous pseudo-capsule

By Andrea Tinelli
Myoma vasculature before and after vasopressin injection
On the other hand, adenomyosis has undefined planes.
Since T. Cullen's classic definition of Adenomyosis 90 years ago, various terms have been coined to describe Adenomyosis. But, there has not been a consensus classification.

Various terms proposed by various authors

- Adenomyoma - nodule & diffuse adenomyosis
- Diffuse adenomyosis of the posterior or anterior uterine wall
- Focal lesions
- Infiltrative lesions

*Thomas Cullen 1920, Kaser O et al 1972, Novak ER & Woodruff JD 1979*
Over fourteen years we’ve observed repeatedly four distinct expressions of uterine adenomyosis

• Some occurred more frequently, others were noticeably uncommon

• However, these types were accompanied with specific symptomatology and occurred at different age groups

• We placed them in four groups based on our clinical observation, symptomatology, macroscopic appearance and histological findings
Finally, we managed to publish our work in 2013, under the title

- Distinct types of uterine adenomyosis based on laparoscopic and histopathologic criteria

G Pistofidis, E Makrakis, O Koukoura et al 2013 Clin Exp Obstet & Gyn
Our classification system of uterine adenomyosis

- **Diffuse**: 37 (54.5%)
- **Sclerotic**: 9 (13%)
- **Nodular**: 19 (28%)
- **Cystic**: 3 (4.5%)
How frequent and what age groups?
Patient age distribution and adenomyosis types

<table>
<thead>
<tr>
<th>Type</th>
<th>Mean (yrs)</th>
<th>St Dev (yrs)</th>
<th>Range (yrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>41.2</td>
<td>6.7</td>
<td>[27 – 59]</td>
</tr>
<tr>
<td>Diffuse (orange)</td>
<td>44.4</td>
<td>6.0</td>
<td>[27 – 59]</td>
</tr>
<tr>
<td>Sclerotic (dark blue)</td>
<td>40.1</td>
<td>6.4</td>
<td>[30 – 47]</td>
</tr>
<tr>
<td>Nodular (yellow)</td>
<td>37.7</td>
<td>5.2</td>
<td>[27 – 45]</td>
</tr>
<tr>
<td>Cystic (light blue)</td>
<td>30.7</td>
<td>2.5</td>
<td>[28 – 33]</td>
</tr>
</tbody>
</table>
Comparison of patients age between the 4 groups

- [Diffuse] vs [Nodular]
  Difference (yrs): 6.7 – P< 0.001

- [Diffuse] vs [Cystic]
  Difference (yrs): 13.7 – P= 0.001

- [Sclerotic] vs [Nodular] – NSS
- [Diffuse] vs [Sclerotic] – NSS
- [Sclerotic] vs [Cystic] – NSS
- [Diffuse] vs [Cystic] – NSS
Symptoms in adenomyosis, endometriosis and fibroids patients

Indications for surgery – Pre-op Symptoms

Until 2013

- Δx of Endometriosis 9%
- Infertility 7%
- Δx of Fibroids 34%
- Pelvic pain - Dysmenorrhoea - Dyspareunia 40%
- Menorrhagia 63%
- Dx of Adenomyosis 71%
Adenomyosis is pretty uncommon compared to fibroids

Out of 508 women with uterine pathology, 36 (7%) had diagnosed adenomyosis
Which diagnostic test?
Terms used to define adenomyosis with Vaginal Ultrasound

- Heterogeneous myometrial area
- Globular asymmetric uterus
- Irregular cystic spaces
- Myometrial linear striations
- Poor definition of endometrial myometrial junction
- Myometrial anterior posterior asymmetry
- Thickening of anterior/posterior wall with increased/decreased echogenicity

Sensitivity 0.79 and Specificity 0.85
Terms used to define adenomyosis with MRI

- Diffuse or local widening of junctional zones (JZ)
- JZ thickness of 15mm
- Subjective thickening of JZ, localized or diffuse
- Ill-defined low intensity lesion
- JZ wider than 12mm
- Uterine enlargement with small hypo-intense myometrial spots

*Sensitivity 74% and Specificity 91%*
Various adenomyotic lesions as they appear on MRI

Kunz G et al Hum Reprod 2005

Normal JZ thickness 7-8 mm maximum up to 10mm

Adenomyotic minor focal lesion

Larger focal adenomyosis of Ant Ut wall

Diffuse adenomyosis
Principles of laparoscopic myomectomy
We separate fibroids into anterior or posterior depending whether they position in the front or behind the red line.
Anterior myomectomy - transverse incision, suturing through the right port
Posterior myomectomy – longitudinal incision, suturing through middle port
Avoid excessive use of diathermy
Always work within the pseudocapsule
Posterior myomectomy-technique
Adenomyosis surgery

Adenomyosis can resemble fibroids
Schematic classification

Four types of uterine adenomyosis

Adenomyotic nodule

Diffuse adenomyosis

Sclerotic adenomyosis

Cystic adenomyosis
Laparoscopic appearance of the four types

• A) Adenomyotic nodule
• B) Sclerotic myometrial adenomyosis
• C) Diffuse adenomyosis
• D) Adenomyotic cyst or cystic adenomyosis
A) Adenomyotic nodule, clinical appearance

Appearance on U/S spherical, well defined lesion in younger women
Presenting with exagerated dysmenorrhea, disproportionate for a myoma
Frequently found in the cornual region or the round ligaments
Resembling type III deep endometriotic lesion of the rectovaginal septum
Nodular adenomyoma
B) Sclerotic myometrial adenomyosis

- Frequently presenting with endometriosis
- Presenting with subfertility, menorrhagia & cyclic pain
- Appearance on u/s, irregular lesion with ill defined border and presence of endometriotic inclusion cysts
- Operatively irregular thickening of the myometrium with an off-white fibrotic appearance, firmly attached to the serosa and endometrium hard and difficult to grasp and suture
Sclerotic adenomyosis

Intact lesion

After lesion was excised
Sclerotic adenomyosis

Excised fibrotic areas

Final result, significant reduction of posterior uterine wall
Sclerotic adenomyosis
Surgery for sclerotic adenomyosis
C) Adenomyotic cyst or cystic adenomyosis

two types: juvenille and adult

**Type I** - juvenile cystic adenomyoma (<20 years)

**Type II** - adult cystic adenomyoma (>20 years)

Presenting in young women with severe dysmenorrhoea

Appearance on US, cystic appearance within the myometrium

Operatively a distinct endometriotic cyst in the myometrium
Adenomyotic cyst or cystic adenomyosis
latrogenic cystic adenomyosis
D) Diffuse adenomyosis

- **Presenting** mainly with menorrhagia more often in older age groups (>40)
- **Appearance** on vaginal U/S symmetric or more frequently asymmetric thickening of the uterine wall, inclusion cysts
- **Operatively**, uniformly thickening of the myometrium with a soft, spongiform texture of the uterus
Other surgical methods

- Fujishita compared two adenomyomectomy techniques. The classic adenomyomectomy with a transverse H incision step wise resection of abnormal tissue. The newer technique yielded 50% pregnancy rate compared with 0% of the older method.

A Fujishita et al 2004. Gynecol Obstet Invest

Takeuchi H et al 2006
Operative outcome in patients with adenomyosis

- **Total**: 54.5% (37) Adenomyomectomy, 45.4% (31) Hysterectomy
- **Cystic**: 100% (3) Adenomyomectomy, 0% (0) Hysterectomy
- **Nodular**: 100% (19) Adenomyomectomy, 0% (0) Hysterectomy
- **Sclerotic**: 89% (8) Adenomyomectomy, 11% (1) Hysterectomy
- **Diffuse**: 19% (7) Adenomyomectomy, 81% (30) Hysterectomy
Surgery for adenomyosis

- Nodular and cystic can has been removed in all cases laparoscopically.
- In eight cases of sclerotic adenomyosis (89%) the major part of the lesion was resected. In some cases Complete Uterine Reconstruction Surgery was necessary (CURES).
- In only 7 (19%) cases of diffuse adenomyosis was cyto-reduction feasible.
Italian multicenter study on complications of laparoscopic myomectomy

Sizzi O et al 2007

- 1998 -2004 four centres
- 2050 laparoscopic myomectomies
- Myoma size 1-20 cm

Complications in 38 (2.02 %) women

- 14 cases of haemorrhage (3 blood transfusion)
- 10 postoperative haematomas
- 1 bowel injury
- 1 postoperative kidney failure
- 2 unexpected sarcomas
- 7 converted to laparotomy
- 2 readmitted for surgery
- 1 laparoscopic hysterectomy

- 386 pregnancies, 1 case (0.26%) of ruptured uterus at 33 weeks

ATTENTION! That one case had adenomyosis!
Conclusions: Adenomyosis

- There is a strong association between adenomyosis, endometriosis and fibroids.
- Sclerotic or focal adenomyosis can present a diagnostic dilemma as it resembles uterine myomas.
- However, the majority of women with sclerotic lesions, in contrast with similar size myomas, complain of dysmenorrhea and menorrhagia.
- Moreover, sclerotic adenomyosis lacks the peripheral vasculature and the pseudocapsule seen on vaginal U/S.
- Nodular adenomyosis commonly occurs in the fundal uterine area near the R. ligaments.
- Further, nodular adenomyosis, in contrast with similar size small myomas, resembles deep endometriotic nodules.
- When sclerotic lesion affects less than 50% of the uterine wall, and is circumscribed, resection is possible (this is arbitrary).
- Part, and not whole resection of adenomyotic lesion, should be avoided, especially in the younger patient.
- Diffused adenomyosis is not surgically correctable.
- Prolonged down regulation is recommended in women with diffused lesion requesting fertility.
Miss you all, have a great time and a great meeting