PART I
for the Diagnosis of Vaginal Candidiasis

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Why Change

• What is wrong with clinical diagnosis?
• Is there anything wrong with the usual laboratory tests?
• **DO WE NEED** New Technology?
“Symptoms of vaginitis are nonspecific, and neither self-diagnosis nor diagnosis by a physician is reliable without laboratory confirmation. The management of vaginitis remains largely empirical, and many assume that vaginitis is never life-threatening and that empirical therapy is always harmless.”

Vaginitis

Symptoms for all are similar!

- **Candida** infection
  - *(Yeast)*
  - 20% to 25%

- **Trichomoniasis**
  - 15% to 20%

- **Bacterial infection**
  - 40% to 50%
Vaginitis with Itchiness

1. FISHY OR OFFENSIVE DISCHARGE
   - NO: BACTERIAL
   - YES: CURDY DISCHARGE

2. CURDY DISCHARGE
   - NO: MISCELLANEOUS
   - YES: CANDIDA

3. MISCELLANEOUS
   - CHARACTERISTIC
     - YES: TRICHOMEONIASIS
     - NO: BACTERIAL
Vulvovaginal Candidiasis (VVC)

• Candida accounts for about 20-25% of vaginal infections
• >50% of women will have an attack of VVC ♦
  – 5-8% of premenopausal women have recurrent VVC
• Major risk factors
  – Pregnancy
  – Diabetes
  – Antibiotics
  – Oral Contraceptive pills
• 5 – 10 million visits to doctors annually (US)
• Estimated that annual cost of VVC was US$1.8B in 1995*

♦ Ferrer J. Vaginal Candidosis: epidemiological & etiological factors, IJGO 2000
♦ Pirotta et al. MJA 2003; 179: 43-46
* Foxman et al. Sexually Transmitted Disease 2000
Candida Species

- Budding yeast
- Commensal of warm blooded animals
- Medically important species
  - *C. albicans*
  - *C. glabrata*
  - *C. tropicalis*
  - *C. pseudotropicalis*
  - *C. krusei*
Vulvovaginal Candidiasis (VVC)

- Presentation
  - Vulvar and vaginal irritation
  - Burning and pruritus (following urination and coitus)
  - Discharge
- Reddened vagina & vulva
- Swollen labia
- Cottage cheese discharge
Vulvovaginal Candidiasis (VVC)

• Diagnosis problematic, as symptoms are non-specific
  – Self-diagnosis (sensitivity 35%, specificity 89%, positive predictive value 62%)
• Without laboratory confirmation, up to 50% of women may have other conditions
• Incorrect diagnosis may lead to overuse of topical anti-fungal agent with risk of contact and irritant vulvar dermatitis *

* Ferrer J. 2000 ISJOG
Diagnosis of VVC

• Normal vaginal pH (4-4.5), positive microscopy and fungal culture

• Microscopy
  – Sensitivity (61%), specificity (77%), PPV (56%)

• Fungal Culture
  – Takes 5 – 7 days
  – 20-50% of asymptomatic women have candida organism as part of endogenous vaginal flora
*Australia Survey on Vaginal Candidiasis (2002). Rockeby biomed Ltd.

+ Singapore Survey on Vaginal Candidiasis (2003). Rockeby biomed Corporation Ltd.
* Singapore Survey on Vaginal Candidiasis (2003). Rockeby biomed Corporation Ltd.
Developing a Serological Test

• As a commensal most people have antibodies to Candida
  – Cell wall antigens *

• Isolated specific internal (cytoplasmic) antigens

• Use to differentiate commensal carriage from infection

* Ostrosky – Zeichner & Rex 2002
Principle of the Candida ELISA

Microtitre tray well coated with the Candida antigen

Any anti-Candida antibodies in the patient serum will bind specifically to the antigen

An enzyme-linked secondary antibody (conjugate) is then added, this binds to the first antibody

A chromogenic substrate is then added and the enzyme converts it to a coloured product

Serum taken from the patient is diluted, and then added to the test well by a lab technician using a pipette

A secondary detection reagent is then added

The test can be read quantitatively using an absorbance plate reader

If Candida antibodies are present in the serum then the reagent will change colour.

1. 2. 3. 4.
Singapore Vaginitis Study

- Prospective study (Nov 2001 – Apr 2002)
- 3 General practices and 1 gynaecology clinic
- Females (21 – 45 years old), with symptoms and signs of VVC (n=50)
- Serum obtained for Syscan3 levels and compared to HVS for Candida culture
- Tested with SysCan3 ELISA
  - >20 units were positive
Mean Anti-Candida Antibody Levels (95% CI)

VVC*

Sensitivity 78%
Specificity 90%
PPV 96.8%

* p<0.001 α=0.001, power=90%
## Comparison of Different Diagnostic Methods for VVC

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<thead>
<tr>
<th></th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>PPV</th>
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<tbody>
<tr>
<td>Self Diagnosis¹</td>
<td>35%</td>
<td>89%</td>
<td>62%</td>
</tr>
<tr>
<td>Vaginal Microscopy¹</td>
<td>61%</td>
<td>77%</td>
<td>56%</td>
</tr>
<tr>
<td>SysCan²</td>
<td>78%</td>
<td>90%</td>
<td>96.8%</td>
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Interpretation of Results

<table>
<thead>
<tr>
<th>Negative</th>
<th>Positive</th>
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<tr>
<td>Antibodies absent</td>
<td>Antibodies present</td>
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<tr>
<td>Control Line</td>
<td></td>
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<tr>
<td>Test Line</td>
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Thrush:  
- Negative: X
- Positive: √
Diagnosis

Clinical Vaginitis → Candida infection?

Candia 5 will confirm or eliminate

YES
Prescribe specific Treatment

NO
Bacterial Trichomoniasis
Summary

- *Candida* a significant cause of vaginitis
- Diagnosis problematic
- POC needed
- CanDia5 the answer
PART II
Treatment of Acute and Recurrent Monilia Vaginitis

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Specialist in Obstetrics and Gynecology
Symptoms of Vaginal Thrush

1. Vaginal itch, discomfort, or irritation
2. Thick, clumpy discharge (“tofu” crumbs)
3. Redness / swelling of vulva
4. Burning sensation on urination
Causes of Thrush

- Antibiotic treatment
- Oral contraceptives
- Diabetes
- Pregnancy
- Immune system disorder and general illness
- No identifiable factor
Treatment of Thrush

- Vulval hygiene - ? Steroid cream
- Clothing
- Nystatin (100,000 unit) BD x 2 weeks
- Clotrimazole (Canesten, Gyne-Lotremin) x 6 days
- Econazole Nitrate (Gyno Pevaryl) x 3 days
- Miconazole Nitrate (Gyno Daktarin) x 3 days
- Isoconazole Nitrate (Gyno Travogen) x 3 days
- Ticonazole Nitrate (Gyno Trosyd) 2 tabs x 1 day
Treatment of Recurrent Thrush (1)

- Supportive – clothing, hygiene, etc.
- Diet – ↓ sweet
- Avoid antibiotics
- Control diabetes
- Husband - ? Diabetes, Condom
- Avoid oral contraceptives
Treatment of Recurrent Thrush (2)

- Weekly vaginal persary (e.g. Isoconazole (Gyno Travogen) 600mg) for 6 months
- Fluconazole (Diflucan) 150 mg x 1 day
- Itraconazole (Sporanox) 2 tab BD x 1 day
- ? Lactobacillus acidophilus