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Complicated Mastitis

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Disclosure

Nothing to Disclose

Historical Perspective

Term/Pathognomonic Factor | Investigators
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Morbid condition of lactiferous duct | Birkett, 1850
Mastitis obliterans | Ingier, 1900
Chronic pyogenic mastitis | Payne et al, 1943
Stale milk mastitis | Deaver and McFarland, 1917
Variocele tumor of the breast | Cromar, 1921
Plasma cell mastitis | Bloodgood, 1923
Involutional mammary duct ectasia with periductal mastitis | Adair, 1933
Comedomastitis | Rice et al, 1948
Periductal mastitis | Geschicker, 1948
Chemical mastitis | Stewart, 1950
Fistulas of lactiferous ducts | Zuska et al, 1951
Mammary duct ectasia | Haagensen, 1951
Squamous metaplasia | Patby and Thackray, 1958
Secretory cystic disease of the breast | Ingleby, 1942
Periductal mastitis/duct ectasia | Ingleby and Gershon-Cohen, 1960

Haagensen Theory

- An evolutionary disease process
- Coined the term *mammary duct ectasia* (dilation of the subareolar terminal ducts)
- Stages in the pathogenesis of subareolar abscess:
  - dilation of ducts + accumulation of debris (no inflammation)
  - periductal inflammation with necrosis
  - fibrosis

Mammary Duct–Associated Inflammatory Disease Sequence (MDAIDS)

- Breast Is A Modified Sweat Gland
  - Squamous Metaplasia + Duct Ectasia → Obstruction
  - Depending On Variables:
    - Location And Extent Of Squamous Metaplasia
    - Degree Of Duct Ectasia
    - Degree Of Obstruction
    - Hormones (Estrogen, Prolactin)
    - Environment (Smoking)
    - Nutrition (Vitamin A Deficiency)
    - Anatomy (Nipple Retraction)
    - Bacterial Growth
• **Initial changes**
  • mild duct ectasia
  • foamy histiocytes with filling of duct lumens

• **As the disease progresses**
  • major ducts exhibit increased ectasia
  • dense inspissation of secretions and periductal fibrosis

• **With infection**
  • abscess: predominant acute inflammatory infiltrate
  • subacute or chronic: inflammatory exudate contains not only polymorphonuclear leukocytes but also lymphocytes, plasma cells, histiocytes, cell debris, and keratin

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**Normal anatomy**

- copious amounts of keratin
- obstruction by keratin plugs
- dilation of the duct and ampulla
- symptom include:
  - noncyclic mastalgia
  - nipple retraction
  - and/or subareolar induration
Hormonal Influences

**Prolactin:**
- Prolactin (dopamine release, altered estrogen metabolism, vitamin A receptor)
- Promote MDAIDS by human milk fat globule membrane (HMFGM) - inhibits adhesion of bacteria

**Estrogen:**
- Estrogen activity (smoking) impairs the hormonally controlled integrity of the breast duct epithelium

Nutritional Factors

**Vitamin A:**
- Deficiency induces keratinizing squamous metaplasia (head and neck, bronchi, uterus, and cervix)
- Increasing evidence that vitamin A (or retinoids) have a significant effect on mammary duct epithelial cell proliferation and differentiation
- Vitamin A deficiency impairs blood clearance of bacteria and results in decreased phagocytic activity in vitro

Smoking

- 90% of recurrent breast abscess are exposed to cigarette smoke for many years
- Risk of a recurrent subareolar breast abscess is cigarette
- Severe periductal inflammation is more often associated with heavy smoking (>10 cigarettes per day) and younger age
- Increased incidence of mammary duct squamous metaplasia
- In the nonlactating breast, 7% of women secretions are mutagenic in the Ames tests and contain oxidized steroids and lipid peroxides. These metabolites might be responsible for direct cellular injury leading to reactive squamous metaplasia

Clinical Presentation

- Incidence is higher
- Closely associated with tobacco among women
- Symptomatic MDAIDS = 20% of benign conditions
- Peak incidence 40-49 y

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**Condition** | **Hormonal or MDAIDS stage** | **Clinical presentation** | **Diagnosis evaluation** | **Treatment**
---|---|---|---|---
Mammary duct ectsasia | Asymptomatic n = 599 (see Table 6A-3) | History Physical examination Cytology of discharge | History/physical examination PNA opsonin - cycle | Antibiotics (eradicates and rehydrates: daptomycin, tigecycline)
| Symptomatic n = 10,165 (see Table 6A-1) | History/physical examination PNA opsonin - cycle | | Discrete smoking - lesions (coarse) duct ectasia, ductal excision, duct plate excision, remote site (tissue)
| Mean: 21% of patients with breast abscess | Mean: 4.5% of patients with breast abscess | History/physical examination PNA opsonin - cycle | | Exclusion of factors and duct plate excision

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Nipple Discharge

- 8% to 84% of Pts
- Secretions Vary From Yellow, Brown, Red To Dark Green
- Consistency Varies From Serosanguineous To Toothpaste-like
- Initially Involve One Duct Or Segment Of The Breast
- May Involve Many Ducts
- May Be Bilateral

Nipple Retraction

- Painless
- Rule Out Cancer
- Length Of History
- Onset Of Symptoms
- Can Develop After One Or Two Inflammatory Episodes
- Long-standing Nipple Inversion Is Benign And Easily Recognized
- Usually Bilateral

> 40 y or Sudden Onset is Malignant Until Proved Otherwise

Clinical/Investigative Feature

- History
- Pain (%)
- Discharge
- Nipple (examined carefully)
- Mass
- Cytology
- Ductography
- Fine-needle aspiration
- Mass
- Follow-up

Mammary Duct Ectasia of MDAIDS

- History >1yr (present since puberty) <1yr
- Pain (%)
- Creamy, green<br>Partial, central, symmetrical<br>Tender, firm lesion with discrete<br>Foam cells<br>Ectatic ducts<br>Cystic lesion, no residual mass
- Nontender, firm lesion with discrete outline
- Nontender, hard lesion with ragged outline
- Biopsy
- No mass: re-examine every 4mo and take annual mammogram

Carcinoma

- History <1yr (present since puberty)
- Pain (%)
- Creamy, brown
- Partial, central, symmetrical<br>Tender, firm lesion with discrete outline<br>Foam cells<br>Ectatic ducts<br>Cystic lesion, no residual mass
- Nontender, hard lesion with ragged outline
- Biopsy
- No mass: re-examine every 4mo and take annual mammogram

Symptomatic (％)

Specific Condition
Nipple Discharge
Asymptomatic 103 8 8 Symptomatic 577 238 41 Nipple Retraction
Asymptomatic 103 7 7 Symptomatic 668 319 48 Pain and Tenderness
Asymptomatic 103 12 12 Symptomatic 183 84 44 Mass (Periareolar)
Asymptomatic 103 33 32 Symptomatic 399 203 51 Abscess
Asymptomatic 103 1 1 Symptomatic 803 124 15 Fistula
Asymptomatic 193 0 0 Symptomatic 176 34 16 Bilaterality
Asymptomatic 495 114 23
Nature and quantity of the discharge, spontaneity, relation to menstrual cycle, pregnancy, and occurrence of trauma. Medications like hormone replacement therapy, psychotropics, and antihypertensive drugs, as well as thyroid disorders and states of hyperprolactinemia, may affect the nature of discharges. Physiologic discharges tend to be bilateral and multiductal in origin, and the secretion is clear to serous to milky and negative for occult blood.

History

Complicated Mastitis & Breast Abscess

- Diagnostic and therapeutic challenge
- No consensus on optimal management strategies

Presentation

Symptoms:
- skin erythema
- palpable mass
- tenderness
- fever
- pain
- most commonly women between 20 and 50 years of age

Nonlactational
- centrally (subareolar or periareolar)

Lactational
- periphery of the breast (upper outer quadrant)

Subareolar And Recurrent Abscess

- Penultimate Stage In The Pathophysiology Of MDADS
- Mixed Organisms (Anaerobes)
- Rapid Onset Of Breast Pain, Tenderness And Swelling Of Central Subareolar Tissue
- History Of Similar Problems
- Resolution Of Symptoms Followed By Asymptomatic Interval (Months / Years) Followed By Recurrence
- Physical Findings Of Tenderness, Swelling, Erythema, Slaughtering Of Skin, And Induration Or Fluctuation
- With Chronic, Recurrent Abscesses: Periareolar Fistula
- With Chronic, Recurrent Abscesses: Periareolar Cellulitis
- Treatment Plan:
  - If the abscess is in its early stages (consisting of an indurated mass), a 2-week course of antibiotics consisting of a cephalosporin and metronidazole, elective excision is planned for 2 to 4 weeks after resolution
  - Mature Abscess
    - If the abscess is fluctuant or has already drained spontaneously, treatment with the patient under general anesthesia consists of making a wide incision to obtain effective drainage and to culture the pus. The patient is then given the two antibiotics for 10 days and monitored weekly to ensure satisfactory resolution with healing. Operative treatment of the abscess and the associated duct under general anesthesia is then planned for 4 to 6 weeks later.
  - Nonsurgical Management
    - Application of warm compresses or heat therapy 2 to 4 times daily for 2 to 4 weeks
    - Elective excision

Association With Breast Cancer

Initial Presentation:
- Inflammatory changes may be the initial presentation of a breast cancer
  - ALWAYS biopsy breast abscesses

Wound Infection After Lumpectomy For Breast Cancer:
- The incidence of acute infection following lumpectomy may be reduced by reapproximation of the deep breast tissue when possible.

Delayed breast cellulitis and abscesses:
- external beam radiation therapy
- brachytherapy

Breast Lymphedema:
- mild erythema
- edema
- secondary to treatment-related disruption of breast lymphatics
- typically self-limited (1 month to 1 year)

Evaluation

Clinical Examination
- mass
- erythema
- skin warmth
- skin thickening
- tenderness

Ultrasound
- adjunct to physical examination
- high

Mammography:
- after successful management of acute breast infection or abscess
- to exclude malignancy

In the acute setting, abnormal mgm and US findings may be difficult to differentiate from malignancy.
Microbiology

- *Staphylococcus aureus* (most common organism)
- *Pseudomonas aeruginosa*
- *Staphylococcus epidermidis*
- *Proteus*
- *Serratia*
- *Bacteroides*
- Sterile on culture: (20 to 40%)

Cigarette smoking

- Increased rates of anaerobic breast infections
- Increased rates of recurrent breast abscess

Body Art (nipple piercing and tattoos)

- Incidence as high as 10% to 20%, in the months following the procedure
- Organisms include aerobic, anaerobic, and mycobacterial infections

Unusual Breast Infections

**Unusual Pathologic Organisms:** (endemic to specific areas and specific patient populations)
- *Actinomyces* species
- *Brucella*
- *Mycobacterium tuberculosis*
- *Fusarium solani*
- *Echinococcus*
- *Cryptococcus*
- *Paragonimus*

Necrotizing Soft Tissue Infection And Gangrene Of The Breast

- Rare
- Polymicrobial in etiology
- Associated with anticoagulant treatment, trauma, and in the postpartum period
- Management similar to other areas:
  - Early diagnosis
  - Early and aggressive surgical management
  - Systemic antibiotics
  - Broad-spectrum antibiotics

Breast Cancer Vs Mastitis/Abscess

- Breast cancer
- Squamous cell carcinoma
- Lymphoma
- Incidence of 4% (routine biopsy of the abscess cavity)
- Percutaneous management for selected cases is acceptable
- Failure to resolve symptoms should prompt tissue biopsies to exclude malignancy


Management

**Antibiotics**

- No or a small fluid collection (PE/US)
- Best directed by local anti-biograms
Management - Aspiration

Alternative To Surgical Management (Lactational And Nonlactational Abscesses)

Benefits: Cosmesis, Avoid General Anesthesia, No Wound Packing, Decreased Cost

Success Rates:
- Single Aspiration: 57% to 79%
- Multiple Aspirations: 90% to 96%

Fail To Improve = Operative Drainage And Tissue Biopsy

Technique:
- 16-gauge needle with aspiration and irrigation of the cavity through an area where the skin is not thinned from inflammation
- Ultrasound to guide aspiration is associated with higher rates of success but is not required
- Oral antibiotics as a component of initial therapy for breast abscess managed with aspiration
- Cultures of aspirated fluid may be useful to guide antibiotic choice
- Following initial management, patients should undergo clinical reassessment to determine resolution of requirement for additional treatment (repeat aspiration or surgical drainage)
- Median time to resolution of breast abscess with aspiration is 2 weeks (range, 1–7 weeks)
- Factors that have been associated with failure of aspiration include large size (>3 cm) and loculations
- Progression or failure of symptoms to improve with serial aspirations mandates surgical management as outlined previously


Management

Surgical Incision and Drainage

- surgical incision
- disruption of septae
- open packing

- limitations to this approach may include need for general anesthesia, high cost, and cosmetic deformity
- recurrence rates between 10% and 38% requiring additional procedures
- biopsy of the abscess cavity wall
- following abscess resolution, mammography and breast ultrasound to exclude malignancy

Operative Technique

Subareolar Dissection

Ductectomy
Thank you!