Systemic Candidiasis

- Caused by overabundance of natural yeast
- Held in check by “good” bacteria in our bodies
- Affects the entire system
- Antibiotics, lowered immune systems, recreational drugs, diabetes, hormonal contraceptives, stress, obesity, poor hygiene, poor diet, many other reasons.

Species: Candida Albicans
Genus: Candida (80%)
First appearance in 1923
Other genus names
- Mycotorula
- Torulopsis
Other species names
- Monilia albicans
- Oidium albicans

Yeast
The Candida genus is made up of yeasts.
Reproduce via asexual budding or sexual spore creation.
The method of reproduction is greatly influenced by the environment.
- Good environment = budding
- Bad environment = sexual spores
Spores are more resistant to harder conditions.

Etiological Agents
- Any species of the Candida genus
  - 150 different species
  - Specifically, Candida Albicans (70-80%)
  - But includes C. glabrata, C. parapsilosis, C. tropicalis, C. krusei, C. kefyr, C. guilliermondi, C. lusitaniae, and C. dubliniensis (which affects almost exclusively HIV patients)

Differences between Species
- C. albicans is the most commonly recovered from patients with candidemia.
- C. glabrata has become more important recently due to its resistance to azoles and polyenes.
- C. krusei is resistant to amphotericin B and azoles in most cases.
- C. parapsilosis is the most commonly associated with catheters.
- C. tropicalis is the most commonly associated with infections in cancer patients and bone marrow transplants.
### Epidemiology
- Typical in patients who are critically ill, in medical or surgical ICUs, and immunocompromised individuals, such as cancer patients or HIV patients. Neonates are also very susceptible.
- In systemic infections, it is the 4th most commonly isolated pathogens from blood cultures and has replaced the Cryptococcus species as the most common fungal pathogen worldwide.
- Systemic candidiasis has caused more deaths than any other systemic mycosis.

### Symptoms
- Redness
- Itching
- Papular rash
- Muscle tenderness
- Discomfort
- Burning
- Soreness
- Discharge
- None

### Diagnosis
- Fever and chills
- Antibacterial therapy
- CT and MRI
- Difficult
- Blood culture

### Prevention
- Antifungal therapies
- Garlic
- Yogurt
- Certain milks
- Low sugars
- Reduced alcohol intake

### Case Report-Patient 1
- 30 yr. old man started on broad spectrum antibiotics for pneumonia due to *Legionella pneumophila*.
  - Admitted to intensive care a few days later.
    - Confusional syndrome, fever and purplish macules and papules involving the face, thorax, and lower limbs.
    - Lesions affected hair follicles mostly.
  - Skin biopsy
    - Perivascular and periadnexial dermal and hypodermal inflammatory infiltrate with lobular necrosis of the fat.

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![Figure 1 Patient 1](image-url)
Patient 1

Figure 2 Patient 1. Biopsy revealed necrosis of the epidermis and vascular thrombosis of small vessels in the underlying dermis. A sparse perivascular infiltrate was evident with variable degree of leucocytoclasia. Occasional small round fungal elements, predominantly spores, were seen between the inflammatory infiltrate (hematoxylin and eosin, original magnification ×200).

Patient 2

• 31 yr. old man with chronic myelocytic leukemia.
  – Underwent bone-marrow transplantation from his human leukocyte antigen-compatible brother.
    • 1 yr. later, he had a blastic crisis and started on induction chemotherapy treatment.
    • Developed erythematous nodules on lower limbs and left arm 20 days later.
      – Approx. 10 nodules, 5-6mm in size
      – Well-defined and slightly infiltrated

Cont...

– Gram and Periodic-Acid-Schiff Stain
  • No bacteria, mycobacteria, or fungi.
– Chest x-ray:
  • Showed alveolar infiltrates consistent with Candida.
– Ocular fundus examination showed retinal involvement.
– Amphotericin B treatment administered.
  • 1 gram total.
  • Cutaneous lesions resolved w/o residual hyperpigmentation within 4 days.

Patient 2

Erythematous ⁄ purplish papules and macules

Cont...

– Some lesions had pustule on surface
– Histopathological examination showed
  • Yeast cells in dermoeipidermal junction with minimal inflammatory infiltrate.
  • Candida tropicalis was isolated from blood.
Cont...

– Computed tomography scan showed:
  • Hepatic, splenic and renal focal lesions, consistent with and infectious origin.
– Patient started on Caspofungin and Voriconazole treatment
  • Most lesions resolved in a few days, with residual hyperpigmentation.

Patient 3


• A 63 year-old male was admitted to hospital after a traffic accident
  • Received treatment for a head injury and multiple fractures

Patient 3

• Patient was unconscious upon admission then later placed on a ventilator

• Corrective surgeries were performed for multiple fractures

Patient 3

• Laboratory investigations yielded normal results

• Was hospitalized for four months before dying

Patient 3

• Autopsy Findings
  – Kidneys were enlarged as well as having irregular grayish white “patchy areas”
  – Necrosis was found throughout the medulla and cortex
  – Microcolonies of Candida species were found in interstitium and tubules

Fig. 1. Cut surface of the kidney, showing grayish white irregular areas involving the entire renal cortex and medullas.

Source: Journal of Forensic and Legal Medicine
Patient 3

- Autopsy (cont.)
  - No other observations pertaining to *Candida* species were found in other major organs
  - Diagnosed with renal candidiasis
    - While not cause of death, was considered a contributory cause of death

Patient 3

Treatment

- The drug of choice is fluconazole due to its ease of use and lower toxicity to the nephrons of the kidneys.
- An important component is the removal of the focus of the infection, such as the catheters.
- Sometimes, surgical removal of the candidal abscesses is required, which can lead to replacement surgeries in some organs, such as valve replacement for endocarditis.
- Ambisome and Abelcet

Works Cited
