FUNGAL INFECTIONS (CANDIDIASIS, ASPERGILLOSIS)

Author: ***Javliyeva Lobar To'lqinovna***
Email: lobarjovliyeva8@gmail.com
Address: Tashkent, Uzbekistan
Place of study: Tashkent State Medical University

Abstract: Fungal infections (mycoses) are a group of infectious diseases caused by opportunistic or pathogenic fungi that range from superficial mucosal involvement to severe systemic disease. This article provides an expanded and in-depth scientific analysis of candidiasis and aspergillosis, focusing on etiology, pathogenesis, morphological changes, immune response mechanisms, vascular invasion, tissue damage, and complications from the perspective of pathological anatomy. Based on Robbins Basic Pathology, Junqueira Histology, Harrison's Internal Medicine, WHO, and CDC sources, it is shown that the main mechanisms include fungal adhesion, tissue invasion, immune evasion, angioinvasion, inflammatory cascade activation, and progressive necrosis.

Keywords: fungal infections, candidiasis, aspergillosis, mycosis, Candida, Aspergillus, pathology, necrosis, invasion, immunity

Abstract:Грибковые инфекции (микозы) представляют собой группу инфекционных заболеваний, вызываемых условно-патогенными или патогенными грибами, поражающими кожу, слизистые оболочки и внутренние органы, вплоть до генерализованных системных форм. В данной статье проведен расширенный научный анализ кандидоза и аспергиллёза с точки зрения этиологии, патогенеза, морфологических изменений, иммунного

ответа, сосудистой инвазии, тканевого повреждения и осложнений в рамках патологической анатомии. На основе Robbins Basic Pathology, Junqueira Histology, Harrison's Internal Medicine, WHO и CDC установлено, что ключевые механизмы включают адгезию грибов, инвазию тканей, уклонение от иммунного ответа, ангиоинвазию, воспалительную реакцию и некроз.

Ключевые слова: грибковые инфекции, кандидоз, аспергиллёз, микоз, Candida, Aspergillus, патология, некроз, ангиоинвазия

Introduction

Fungal infections are widespread opportunistic infections in the human body and usually develop in immunocompromised patients. Under normal conditions, some fungi are part of the normal microbiota, but when the balance is disrupted, they gain pathogenic properties and begin invasive growth into tissues.

Candidiasis is most commonly caused by Candida albicans and affects the oral cavity, esophagus, genital tract, and skin. In severe cases, it may spread through the bloodstream and lead to systemic candidiasis. Aspergillosis is caused by Aspergillus fumigatus and related species and mainly affects the lungs, but in severely immunocompromised patients it may spread to the brain, heart, and kidneys.

Candidiasis presents with mucosal inflammation, white plaques, and necrosis in severe forms.

Aspergillosis is characterized by vascular invasion, hemorrhagic necrosis, and granulomatous inflammation in lung tissue.

Literature review

In Robbins Basic Pathology, fungal infections are closely associated with immune status, especially neutrophil deficiency leading to invasive mycoses. Junqueira Histology explains that fungal cell wall components such as β-glucan and mannans activate immune responses and inflammatory cascades.

Harrison's Internal Medicine describes that invasive aspergillosis can damage pulmonary blood vessels, leading to thrombosis and hemorrhagic infarction. WHO and CDC data indicate that candidiasis is one of the most common opportunistic hospital-acquired fungal infections.

William H. Welch significantly contributed to the understanding of fungal disease pathology and morphological foundations.

Materials and methods

This study was conducted based on a comprehensive analysis of scientific literature in pathological anatomy, microbiology, immunology, and clinical infectious diseases. Biological characteristics of Candida and Aspergillus species, virulence factors, biofilm formation, adhesion mechanisms, and interactions with the immune system were analyzed. Special attention was given to angioinvasion and tissue necrosis mechanisms.

Results

In candidiasis, pseudohyphae formation on epithelial surfaces, biofilm development, inflammatory infiltration, epithelial destruction, and in severe cases bloodstream invasion were observed. In aspergillosis, invasive fungal growth in lung tissue, vascular wall destruction, thrombosis, hemorrhagic necrosis, and sometimes dissemination to other organs were identified.

Conclusion

Fungal infections can cause severe and life-threatening pathological processes, especially in immunocompromised individuals. Candidiasis and aspergillosis may present not only as localized infections but also as systemic diseases. Early diagnosis, laboratory confirmation, and antifungal therapy are essential to reduce complications. Pathological anatomy plays a fundamental role in understanding the mechanisms of these diseases.

References

1. Robbins Basic Pathology http://www.elsevier.com/books/robbins-basic-pathology/kumar/978-0-323-53113-9

2. Junqueira Basic Histology

http://www.mheducation.com/junqueira-basic-histology

3. Harrison's Principles of Internal Medicine
http://accessmedicine.mhmedical.com/book.aspx?bookid=3095

4. World Health Organization – Fungal diseases http://www.who.int/news-room/fact-sheets/detail/fungal-diseases

5. Centers for Disease Control and Prevention – Fungal infections
http://www.cdc.gov/fungal

6. Medscape – Candidiasis overview
http://emedicine.medscape.com/article/213853-overview

7. Medscape – Aspergillosis overview
http://emedicine.medscape.com/article/296052-overview

8. NCBI – Candidiasis pathogenesis http://www.ncbi.nlm.nih.gov/pmc

9. NCBI – Aspergillosis clinical features http://www.ncbi.nlm.nih.gov/pmc

10. OpenStax Microbiology http://openstax.org/details/books/microbiology

11. Atlas of Human Fungal Infections
http://atlasoffungalinfections.org

12. ASM Clinical Microbiology Manual
http://asm.org/clinical-microbiology

13. IDSA Guidelines
http://www.idsociety.org/guidelines

14. ESCMID Infectious Diseases resources http://www.escmid.org

15. Mycology Research database
http://www.mycologyresearch.org