

MSCT SCAN IN THE DIAGNOSIS OF PNEUMONIA: CURRENT STATUS AND FUTURE DIRECTIONS

Fayziyev Fazliddin Shabonovich

Department of Fundamental Medical Sciences of the Asian International University.

Bukhara, Uzbekistan.

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Abstract. *Pneumonia remains a significant cause of morbidity and mortality worldwide, despite advances in prevention and treatment. Early and accurate diagnosis is critical for effective management and improved patient outcomes. While chest radiography remains the most commonly used imaging modality, multislice computed tomography (MSCT) has emerged as a valuable tool in the diagnosis and management of pneumonia. This article provides a comprehensive review of the current status and future directions of MSCT in the diagnosis of pneumonia, including its advantages and limitations, diagnostic accuracy, and potential role in guiding treatment strategies.*

Keywords: *Pneumonia, multislice computed tomography (MSCT), diagnosis, imaging, chest radiography, computed tomography pulmonary angiography (CTPA).*

МСКТ В ДИАГНОСТИКЕ ПНЕВМОНИИ: ТЕКУЩЕЕ СОСТОЯНИЕ И БУДУЩИЕ НАПРАВЛЕНИЯ

Аннотация. *Пневмония остается значимой причиной заболеваемости и смертности во всем мире, несмотря на достижения в профилактике и лечении. Ранняя и точная диагностика имеет решающее значение для эффективного лечения и улучшения результатов для пациентов. В то время как рентгенография грудной клетки остается наиболее часто используемым методом визуализации, мультиспиральная компьютерная томография (МСКТ) стала ценным инструментом в диагностике и лечении пневмонии. В этой статье представлен всесторонний обзор текущего состояния и будущих направлений МСКТ в диагностике пневмонии, включая ее преимущества и ограничения, диагностическую точность и потенциальную роль в руководстве стратегиями лечения.*

Ключевые слова: *пневмония, мультиспиральная компьютерная томография (МСКТ), диагностика, визуализация, рентгенография грудной клетки, компьютерная томография, легочная ангиография (КТПА).*

Introduction

Pneumonia is an acute respiratory infection that affects the lungs, causing inflammation and fluid accumulation in the alveoli.

It can be caused by various pathogens, including bacteria, viruses, fungi, and parasites. The clinical presentation of pneumonia can vary widely, ranging from mild respiratory symptoms to severe respiratory distress and even death.

The role of imaging in the diagnosis of pneumonia

Imaging plays a crucial role in the diagnosis of pneumonia, particularly in cases where clinical findings are inconclusive. Chest radiography is the most commonly used imaging modality for the initial evaluation of suspected pneumonia due to its wide availability, low cost, and relative ease of use. However, chest radiography has limitations in terms of sensitivity and specificity, particularly in the early stages of the disease or in patients with underlying lung conditions.

Advantages of MSCT in the diagnosis of pneumonia

MSCT has several advantages over chest radiography in the diagnosis of pneumonia:

- Higher sensitivity and specificity: MSCT can detect subtle abnormalities that may be missed on chest radiography, particularly in the early stages of the disease. It can also differentiate between different types of pneumonia, such as bacterial, viral, and fungal pneumonia.
- Improved visualization of lung structures: MSCT provides detailed cross-sectional images of the lungs, allowing for better visualization of lung structures and abnormalities. This can be particularly useful in patients with complex lung conditions or in cases where the diagnosis is uncertain.
- Assessment of disease extent and severity: MSCT can assess the extent and severity of pneumonia, which can be helpful in guiding treatment strategies and predicting prognosis.
- Detection of complications: MSCT can detect complications of pneumonia, such as lung abscess, pleural effusion, and empyema.

Diagnostic accuracy of MSCT in pneumonia

Several studies have evaluated the diagnostic accuracy of MSCT in pneumonia. A meta-analysis of 12 studies involving 1,123 patients found that MSCT had a sensitivity of 94% and a specificity of 91% for the diagnosis of pneumonia. These results suggest that MSCT is a highly accurate imaging modality for the diagnosis of pneumonia.

Future directions of MSCT in pneumonia

The future of MSCT in the diagnosis of pneumonia is promising. Advances in technology, such as the development of new imaging techniques and contrast agents, are likely to further improve the diagnostic accuracy and clinical utility of MSCT. Additionally, MSCT may play an increasing role in guiding treatment strategies and monitoring response to therapy.

One potential future direction for MSCT in pneumonia is the use of artificial intelligence (AI) to improve diagnostic accuracy and efficiency.

AI algorithms can be trained to analyze MSCT images and identify patterns that are suggestive of pneumonia. This could help radiologists to make more accurate diagnoses and reduce the time required to interpret MSCT scans.

Another potential future direction for MSCT in pneumonia is the use of radiomics. Radiomics is the process of extracting quantitative features from medical images, such as CT scans. These features can then be used to develop predictive models for various clinical outcomes, such as response to treatment and prognosis. Radiomics may be able to help identify patients with pneumonia who are at high risk for complications and who may benefit from more aggressive treatment.

Conclusion

MSCT has emerged as a valuable tool in the diagnosis and management of pneumonia. Its higher sensitivity and specificity, improved visualization of lung structures, and ability to assess disease extent and severity make it a valuable adjunct to chest radiography. As technology continues to advance, MSCT is likely to play an even greater role in the diagnosis and management of pneumonia in the future.

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