عنوان مقاله:

Investigation of Fetal Radiation Dose in CT Scan Diagnostic Method with a Dose Reduction Approach in Pregnant Patients

محل انتشار:

سومین کنگره بین المللی انجمن علمی دانشجویان رادیولوژی کشور (سال: 1402)

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نویسندگان:

S Aliakbari - *Department of Radiology, Allied Health Sciences Faculty, Semnan University of Medical Sciences, Semnan, Iran*

P Hejazi - *Department of Medical Physics, Semnan University of Medical Sciences, Semnan, Iran*

A Hossein pour - *Student search committee Semnan University of Medical Sciences, Semnan, Iran*

M Fazeli nasab - *Student search committee Semnan University of Medical Sciences, Semnan, Iran*

M Hasani - *Student search committee Semnan University of Medical Sciences, Semnan, Iran*

خلاصه مقاله:

Introduction: When using diagnostic methods such as CT scans and radiography, the primary priority is to obtain high-quality images while considering the minimum radiation dose to the patient. However, in pregnant patients, controlling the radiation dose to prevent harmful effects on the fetus is crucial. In some cases, performing a CT scan is vital for diagnosing diseases such as PE (pulmonary embolism), trauma, and aortic aneurysm[۱, ۲]. This study aims to investigate the radiation dose to the fetus in two types of scans: abdominal-pelvic and chest scans in pregnant patients. Materials and Methods: Initially, keywords such as "CT in pregnancy," "fetal absorbed dose," "dosimetry," and "estimation" were collected from databases including PubMed, Scopus, Science Direct, and the Google Scholar search engine. Studies published between ۲۰۰۷ and ۲۰۲۲ were selected. Among the ۵۰ articles, ۳۵ articles with the most relevant titles to the research objective were chosen. The results extracted from these articles were then reviewed.Results: The first trimester of pregnancy is considered the most sensitive period to the effects of radiation exposure on the fetus. In the second and third trimesters, fetal resistance to radiation increases, but receiving a dose greater than ۵۰۰ mGy may lead to adverse effects such as growth disorders[۳]. In the newer perspective, the fetal dose threshold for deterministic effects has decreased to ۱۰۰ mGy[۴, ۵]. According to ACR statements, the risk of developing oncological diseases in fetuses exposed to a dose of ۲۰ mGy is ۱ in ۱۲۵[۶]. However, according to ICRP reports, the risk of developing oncological diseases in fetuses is lower, with a ratio of ۱ in ۵۰۰ for a dose of ۳۰ mGy[۷].The analysis of the results shows that in chest scans, the fetal absorbed dose increases with the progression of gestational weeks, and this increase is attributed to the fetus's proximity to the chest. The average dose change from week ۸ to week ۳۸ is ۰.۴۳ mGy[۷]. In small abdominal and pelvic scans, there is not a significant increase in fetal dose with the progression of gestational weeks[۸]. Conclusion: In conclusion, based on the reviewed studies, it can be stated that the reported absorbed dose in studies for chest and abdominal-pelvic scans is much lower compared to the doses recommended by relevant radiation protection organizations. Ultimately, among the three methods, reducing the scan length, modifying technical parameters such as increasing kvp and pitch, and using shielding for reducing

... fetal dose, reducing the scan length is the most effect

کلمات کلیدی:
feta dose, CT scan, scan length