累積X線線量は急性MIで入院中の患者において高い

急性心筋梗塞で入院した患者は入院中に高線量の電離放射線を被曝する

Patients admitted to hospital for acute myocardial infarction receive high ionizing radiation dose during stay

急性心筋梗塞(MI)患者の入院中の平均電離放射線被曝量が検査による胸部X線撮影の725倍であるとの研究結果が2009年American Heart Association学会で発表された。MI患者の総被曝量を調査した初めての大規模スタディにおいて、研究者らは急性MIの治療を受けた患者64,074人(女性23,394人男性40,680人)のデータを解析した。スタディによると、患者らは電離放射線を使用した検査を合計で276,651件受けた。つまり、患者一人当たり平均7件の検査を受けたことになる。患者らの入院中の累積被曝量は14.52mSv―原子力発電および他の電離放射線を扱う環境で勤務する者に許可されている年間累積線量の約3分の1―であった。解析された9つの検査中、全患者のうち83%が胸部X線撮影を、77%はカテーテル検査を、15%は体部のコンピュータ断層撮影を、12%は頭部CTを施行された。1%～6%の患者が他の3つの核医学検査および胸部CT検査を施行された。

Full Text

Acute myocardial infarction patients received an average total dose of ionizing radiation equal to 725 chest X-rays from medical tests during their hospital stay, according to research presented at the American Heart Association's Scientific Sessions 2009.

In the first large study to examine total radiation dosage in heart attack patients, researchers found those admitted to academic hospitals had a cumulative effective radiation dose of 14.5 millisieverts (mSv) - about one-third the annual maximum accumulation permitted for workers in nuclear power plants and other ionizing radiation environments.

"It's potentially a new way to consider radiation exposure and safety," said Prashant Kaul, M.D., lead author of the study and a fellow in cardiovascular medicine at Duke University Medical Center in Durham, N.C. "We think physicians should not only have a greater awareness of dose accumulation from the tests they are ordering, but also understand the testing patterns they use for common diagnoses."

Total short-term exposure likely counts, he said. A person's lifetime exposure to ionizing radiation can potentially increase the risk of cancer. However, risk estimates vary for developing malignancies at specific exposure levels.

Physicians perform several billion imaging studies annually worldwide, about one-third of them in cardiovascular patients. The collective dose received annually from ionizing radiation medical tests increased an estimated 700 percent between 1980 and 2006, according to the American Heart Association.

Kaul urged increased efforts to better determine the appropriate use of various radiation-based tests when assessing and treating heart attack patients.

"We should not withhold necessary, appropriate tests that involve ionizing radiation - they provide very important information," Kaul said. "What we should do is evaluate and understand the clinical indications for tests that involve ionizing radiation. We need to be sure they are being done appropriately."

Researchers analyzed data from 64,074 patients - 23,394 women and 40,680 men - treated for acute heart attack between 2006 and the second quarter of 2009 at 49 academic hospitals throughout the United States that participate in the University Health System Consortium and subscribe to their resource manager database.

Among the study's findings:

- Patients received 276,651 tests that used ionizing radiation, an average of seven per patient.
- Patients averaged a total accumulation of 14.52 mSv during their hospital stay.
- Among the nine types of tests analyzed, 83 percent of all patients received chest X-rays; 77 percent had catheter procedures; 15 percent underwent body computed tomography (CT) scans; and 12 percent had a head CT.
- Between 1 percent and 6 percent of patients had three other nuclear imaging tests and chest CT.

Physicians tend to focus on the radiation dose of each procedure rather than the cumulative dose a patient will receive, he said. "This makes the risk seem smaller to patients than it actually is. The risk at an individual level is small with one test, but with multiple tests the risk likely increases. Additionally, a small individual risk applied to a growing and aging population could potentially represent a future public health problem, especially if the trend continues to be increased use of cardiac imaging tests involving ionizing radiation."

The study has several limitations. For one, the researchers used estimates of typical effective radiation doses from several sources, including the American Heart Association Committee on Cardiac Imaging. Thus, their reported cumulative and radiation dose per patient is an estimate rather than actual measurement.

Moreover, the researchers selected nine tests used in assessing heart attacks for their study, but physicians may also use others.

Manesh R. Patel, M.D, is co-author of the study.

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トピックス一覧

[News01]
心停止後早期の低体温療法は生存率を上昇させる

[News02]
突然死患者の死後遺伝子検査は患者の血縁者において費用対効果に優れる

[News03]
スタディの結果HDL増加はLDL降下に勝る

[News04]
血小板機能アッセイ―役立つものもあれば役立たないものもある

[News05]
CABG後の簡単な共同ケアによりうつが減少する

[News06]
TicagrelorはプライマリPCIにおける心イベントを軽減する

[News07]
Cangrelorは一次エンドポイントでは有益性を示さなかったがいくつかの二次エンドポイントにおいては有意な結果を示した

[News08]
乳児の心臓奇形に対する二つの術式の成績の比較は複雑な結果であった

[News09]
一部の心不全患者には低用量のカルベジロールが有効である

[News10]
連続流LVADを用いることにより生存率が上昇する

[News11]
施設の心臓手術の可否はPCI後の死亡率に影響しない

[News12]
貧血治療薬のリスクは有益性を凌駕する

[News13]
心不全患者の鉄欠乏を補正することにより症状が改善する

[News14]
累積X線線量は急性MIで入院中の患者において高い

[News15]
大豆はオメガ3脂肪酸の有益性を増強させる

[News16]
アスピリンにクロピドグレルを併用しても有意な有益性は認められない

[News17]
性別に応じた心臓リハビリテーションはうつ病を改善する

[News18]
オフポンプバイパス術はステント術よりも認知機能の結果が良好である