Back to Basics: Increasing the use of Posteroanterior Chest Radiograph to Aid Assessment of Chest Pain for Aortic Dissection

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Why is this relevant?

• 46♂ admitted with sudden onset chest pain and hypotension.
• CXR (AP projection) - widened mediastinum noted. Disregarded due to projection
• Initially treated as ACS

• Likely pericarditis/musculoskeletal pain

• Discharged home on analgesia with a plan for outpatient CT-Coronary Angiogram, echocardiogram and follow up in 6-8 weeks

• Died suddenly at home – ruptured thoracic aortic aneurysm
Outline

• Value of CXR in aortic dissection
• Aims of study
• Methods
• Results
• Discussion
Aortic dissection

• A life threatening event
• Dissection typically presents with pain (90%)\(^1\) – sudden onset severe tearing/sharp pain radiating to the back
• A challenging diagnosis – many present with non-specific signs and symptoms
Imaging Modalities

- **High risk cases:** CT aortography is the gold standard\(^2\)

- **Intermediate/low risk:** CXR to aid diagnosis

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Members et al. 2010 ACCF/AHA/AATS/ACR/ASA/SCA/SCAI/SIR/STS/SVM Guidelines for the Diagnosis and Management of Patients With Thoracic Aortic Disease
PA vs AP

• Less magnification of the mediastinum and heart due to divergence of the X-ray beam\(^3\) BUT requires patient to stand

![AP vs PA comparison](image)

• 90% of aortic dissections have some abnormality on chest radiograph\(^4\)
  • Most common abnormality: mediastinal widening, 60-90% of cases\(^5\)

• PA chest radiograph is more sensitive and specific for aortic dissection than AP view\(^6\)
  • 90% specificity and 88% sensitivity for maximal mediastinal width
  • 90% sensitivity and specificity for left mediastinal width
Aims

• Evaluate the proportion of PA chest radiographs performed for Emergency Department (ED) patients presenting with chest pain

• Identify reasons why PA radiographs not performed

• Increase the proportion of PA chest radiographs performed
Methods

• Cross sectional study – identified 80 ED patients presenting with chest pain/tightness/discomfort

• Two-pronged intervention:
  • Radiographers:
    • Education on importance of PA orientation
    • Signs encouraging performance of PA radiographs
  • Doctors
    • Signs requesting ED doctors to specify “PA CXR” and patient ability to stand safely on CXR request forms

• Performance re-audited on 73 patients.
Bar chart comparing % proportions of each radiograph orientation (95% CI), with NS radiographs corrected
• Mean age of PA radiographs in first and second cycles was 54.6 and 53.1 respectively, with AP being 71 and 70.8 respectively
Discussion: Communication is key!

• Mean age for AP films was similar – likely inappropriate AP films being performed

• Anecdotal reports found uncertainty of patients being able to stand was a major factor

• Improving communication between the doctors and radiographers via the CXR request form, specifying the need for a PA film and if the patient could stand, can lead to more PA films being performed

• This may improve dissection detection rate in low/intermediate risk cases
References


Results

• Increased proportion of PA radiographs being performed
• Proportion increased from 50±10.96% to 83.6±8.50% (to 95% confidence intervals)
• A two tailed Z-test showed significance: Z= -4.3776, p < 0.001

• The proportion of AP CXRs reduced from 50±10.96% to 13.7±7.89%

• Mean age of PA radiographs in first and second cycles was 54.6 and 53.1 respectively, with AP being 71 and 70.8 respectively
Pie charts of numbers of chest radiographs performed in first and second cycles of audit

PA = posteroanterior, AP = anteroposterior, NS = non-specified