

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

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Introduction

Aortic dissection is a severe and potentially fatal pathology. This project was prompted by the death of a 46-year-old male from a ruptured aortic aneurysm, with a widened mediastinum on anteroposterior chest radiograph disregarded due to the radiograph projection.

Over 90% of aortic dissection patients experience chest or back pain¹. Speciality guidelines have created an emergency department diagnostic pathway². CT aortography is the gold standard investigation in high risk cases³, but chest radiograph is recommended to aid diagnosis in intermediate and low risk patients.

90% of aortic dissections have some abnormality on chest radiograph⁴, with mediastinal widening in 60-90% of cases^{5,6}. Posteroanterior (PA) chest radiograph is considered superior to anteroposterior (AP) radiograph for assessing this, due to less mediastinal and cardiac magnification^{7,8}.

Aim: To increase the proportion of PA chest radiographs performed for patients presenting with chest pain to Accident and Emergency (A&E).

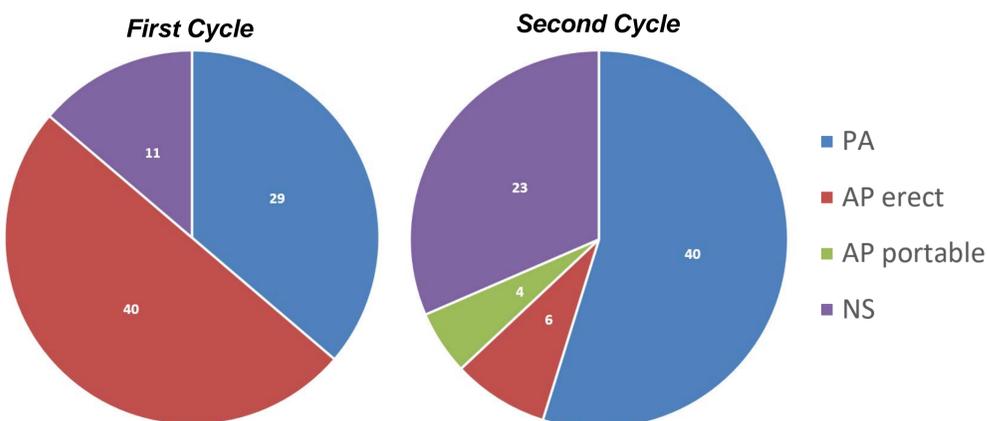


Figure 1: Pie charts of numbers of chest radiographs performed in first and second cycles of audit. PA = posteroanterior, AP = anteroposterior, NS = non-specified

Methodology

Audit:

Cross sectional study reviewing A&E records identified 80 patients presenting with chest pain/discomfort, their age and CXR orientation (either PA, AP or non-specified, NS).

Intervention:

Radiographers were briefed on the importance of PA radiograph, and signs used to encourage PA CXR for patients presenting with chest pain when safe

A&E doctors were educated about the advantages of PA vs AP in the context of aortic disease, and signs asking them to specify PA CXR and if the patient could stand safely on radiograph request forms

Re-audit:

Performance was re-audited between 26th February and 6th March 2018. NS orientations were clarified as PA or not with radiographers.

References

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Results

First cycle: All NS films were assumed to be PA films to estimate the best possible performance. Of 80 chest pain patients with chest radiographs (n=80), 40 (50±10.96%) were AP and 40 (50±10.96%) were PA. The mean age of AP films was higher than PA – see **table 1**.

Second cycle: Revealed an increase in the proportion of PA radiographs taken – see **fig. 1 and 2**. Of 73 patients identified (n=73), 40 (83.6±8.50%) were PA, 10 (13.7±7.89%) were AP and 2 (2.7±3.75%) were NS. Mean age of AP films was higher than PA – see **table 1**. A two tailed z test comparing the proportions of PA radiographs performed in both cycles showed significance with a Z value of -4.3776, with p < 0.001. 16.7% of AP erect radiographs had documentation justifying why PA CXR was not performed.

	Audit			Re-Audit		
	Number	Percentage proportion	Mean Age	Number	Percentage Proportion	Mean Age
PA	40	50±10.96%	54.6	61	83.6±8.50%	53.1
AP	AP Erect	40	50±10.96%	6	13.7±7.89%	70.8
	AP Portable			4		55.5
NS				2	2.7±3.75%	67.5

Table 1: Summary of the number, percentage proportion (with 95% confidence interval) and mean age of radiographs of each orientation, in first and second audit cycles. PA = posteroanterior, AP = anteroposterior, NS = non-specified

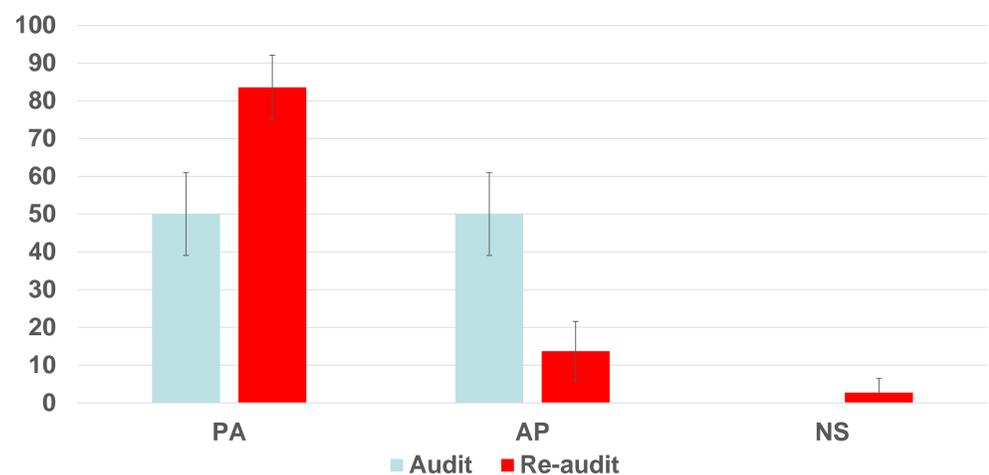


Figure 2: Bar chart comparing the percentage proportions of each radiograph orientation (with 95% confidence intervals), with NS radiographs corrected, in first and second audit cycles. PA = posteroanterior, AP = anteroposterior, NS = non-specified

Conclusions

Improved communication between doctors and radiographers via the CXR request form may lead to increased PA film execution

Generally, AP radiographs are performed in those less able to stand as, assuming age correlates with decreased mobility, mean AP radiograph age was higher than PA. However, as the proportion of AP films markedly reduced, perhaps initially AP films were inappropriately performed when PA film was possible

Improved documentation as to why PA CXRs are not performed is needed

Few guidelines state PA CXR specifically should be performed. One study found PA CXR more sensitive and specific for aortic dissection than AP view⁹. Perhaps increasing the performance of PA CXR can increase patient safety by increasing detection of aortic dissection in low/intermediate risk patients.