Too many tests
A quality improvement study assessing usefulness of chest radiographs post drain removal in post operative cardiac & cardiothoracic patients

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Why do Audit?

Most chest drain removal CXRs and subsequent CXRs ordered routinely

Questions

Was this really the case?

Is there any evidence in literature to support this practice?

Did it change management?
Currently no NICE, SIGN or BTS guidelines on use of chest radiographs post drain removal.

Guidelines section on website states that BTS guidelines used have been accredited by NHS evidence. – Current no evidence based practice to support this routine procedure

On [www.evidence.nhs.uk](http://www.evidence.nhs.uk)
Rate of resolution is 1.25% and 2.2% of the volume of pneumothorax over 24 hours.

Complete resolution is estimated to take up to 6 weeks

<2cm = small, > 2cm = large
A prospective study aimed to measure the benefit and number of pneumothorax cases detected by chest X-ray, which would otherwise have been missed.

In 48 (98%) patients, the chest X-ray did not provide any additional information of clinical significance to alter the patient management.

750 cardiac procedures were carried out every year in the author’s institution, the cost saving of omitting a single chest X-ray was estimated to be about £10,000 every year.
Aim: To determine if routine CXR were necessary post drain removal in cardiothoracic patients

Method: PubMed search for 1948 to November 2011, obtained 356 papers of which 6 were deemed suitable. Level 3 evidence


Paper 2 - Eisenberger and Kabbaz (2011) - 400 patients: only 2.5% (small) and 3% medium PTX would have been missed if no routine CXR of which only 25% (i.e. 1) had intervention of drain reinsertion

Conclusion

Routine CXR should only be performed if clinically indicated
Methodology

Selection Criteria – Post Operative patients who had routine CXR in WARD 102 (symptomatic and asymptomatic) between 09/02/11 to 01/08/11 (6 month period)

Total patients: 106, Included: 76, Age range 23-81, Average age: 60.8, Male: Female (48:28)

Exclusion Criteria: Preoperative pneumothorax, concurrent preoperative chest pathology i.e. pleural effusion, non-cardiac/cardiothoracic surgery, insufficient EPR patient info

Inclusion Criteria: Chest Drain inserted intra operatively
Categorised

No PTX on post operative CXRs

Number 54 (15 Excluded)

Males to Female 38:16

Age 23-81, Average : 60.2

PTX post Operatively- Sub grouped into Drain in-situ (A) Immediate post OP PTX (B) Delayed PTX

Number: 22 (15 excluded)

Males to Female: 10:12

Age 26-81, Average: 61.35
Category 1: No PTX with Drain in situ

- Total Number of CXR post DR: 76
- Range CXR: 1-21
- Average CXR: 1.4
Category 1- Drain Removed (DR) PTX

- Numbers 13 (24%)
- Age Range 24-71, Average
- Males to Females: 7: 6
- Average: 2.5 days before drain removed
- Average PTX size: 13.31 (AM), of which 1/13 was significant/large measuring up to 33mm
- All asymptomatic, no change in management
- 3/13 were discharged with small PTX on F/U, 2/3 had residual PTX
Category 2: (A) Immediate post OP PTX (18% of all patients in study)

Total Number Patients: 14

Male to Female: 6:8

Average Age: 60.9

Range of PTX: 2.12 -111.78 (AM), 19.83 (BR– only two measurable in this dimension)

Average AM PTX 33.85, BR: 9.9

Only 4/14 represented large PTX (28%)

Largest PTX had a drain already inserted.
Category 2: (B) Delayed PTX with Drain in situ

Total number: 8

Males to Female: 4:4

Average Age: 61.8

Average days for PTX to appear: 3.5 (range 2-7)

2/8 had symptoms not related to PTX; ? infection and surgical emphysema

One bilateral but no new intervention

Average size of PTX: 38.17 (AM) of which 6 were large
Conclusions

Previous studies have shown 79% detection rate of chest pathology on clinically suspicious CXR, while 4-40% (17% in this group, 28% adjust for other suspected pathology) on routine, of which few had any intervention/change in management.

Post drain removal: 88% of chest radiographs could have been avoided.

92% of chest radiographs done resulted in no
Decision to obtain a radiograph should be based on clinical judgment alone which could result in cost savings without compromising patient safety.