Are routine chest radiographs necessary after image-guided placement of internal jugular central venous access devices
Chang T C, Funaki B, Szymski G X

Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Routine chest radiographs after image-guided placement of internal jugular central venous catheters.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Patients who had a new internal jugular central venous access device placed.

Setting
Hospital. The study was carried out at the University of Chicago Hospitals, Chicago, Illinois, USA.

Dates to which data relate
Effectiveness data were collected from November 1994 to November 1996. The price year was 1997.

Source of effectiveness data
Effectiveness data were derived from a single study.

Link between effectiveness and cost data
The costing was undertaken on the same patient sample as that used in the effectiveness study, and was carried out prospectively alongside the effectiveness study.

Study sample
424 patients in whom 572 internal jugular catheters were placed by sonographic and fluoroscopic guidance. Inspiratory and expiratory chest radiographs were obtained for all patients. Any patient with a pre-existing catheter which was simply manipulated or exchanged was excluded from the study. No power calculations were reported.

Study design
The design was a retrospective cohort study carried out at a single centre. No patients were lost to follow-up.
Analysis of effectiveness
The analysis of the clinical study was based on treatment completers. The primary health outcomes used were the rate of procedural complications, number of cases of catheter malposition or pneumothorax detected, and the probability of detecting a procedural complication. No explicit comparison group was used.

Effectiveness results
None of the routine post-procedural chest radiographs revealed a procedural complication. No cases of catheter malposition were encountered. The information obtained from the post-procedural chest radiograph did not alter treatment in any patient. Delayed pneumothorax was detected after placement of two catheters when patient symptoms prompted additional radiographs. At the 95% confidence level, the probability of detecting a procedural complication on a routine post-procedural chest radiograph was 0.5% or less.

Clinical conclusions
Immediate post-procedural chest radiographs are not routinely needed after image-guided insertion of internal jugular central venous catheters.

Modelling
No modelling was undertaken.

Measure of benefits used in the economic analysis
The primary benefit measure was the rate of procedural complications detected by routine chest radiographs.

Direct costs
Discounting was not relevant due to the short period of analysis. Quantities and costs were not reported separately. Charge data were used as a proxy for the costs to the radiology department for obtaining routine chest radiographs. The quantity/cost boundary adopted was that of the hospital. The estimation of quantities and costs was based on actual data. Charge data were obtained from the Medicare Physician Fee Schedule. The price year was 1997.

Statistical analysis of costs
No statistical analysis of costs was carried out.

Indirect Costs
Not reported.

Currency
US dollars ($).

Sensitivity analysis
No sensitivity analysis was undertaken.

Estimated benefits used in the economic analysis
None of the routine post-procedural chest radiographs revealed a procedural complication. Delayed pneumothorax was detected after placement of two catheters (5%) when patient symptoms prompted additional radiographs.
Cost results
The Medicare reimbursement for chest radiographs would have been $39,559.52 in total or $34.58 per chest radiograph. This represents the incremental cost over the alternative of not routinely undertaking chest radiographs.

Synthesis of costs and benefits
Costs and benefits were not combined into a cost-effectiveness ratio.

Authors' conclusions
Immediate post-procedural chest radiographs are not routinely needed after image-guided insertion of internal jugular central venous catheters and unnecessarily add to the cost of patient care. The authors believed that chest radiographs should only be undertaken if venipuncture is difficult or if the patient has an underlying medical disorder that will prevent tolerance of even a small pneumothorax is cost-effective and does not compromise patient safety.

CRD COMMENTARY - Selection of comparators
The rationale for the choice of the comparator was clear.

Validity of estimate of measure of benefit
The measure of benefit would appear to be valid. The authors did not examine patient preferences with respect to chest radiographs. Radiographs may have a reassurance value and hence affect process utility. No statistical analysis of the effectiveness measures was carried out.

Validity of estimate of costs
Charge data were used which do not represent true opportunity costs, and which can be expected to overestimate true costs. It was not possible to examine which specific costs were included in the charge estimate. Hence, these results cannot be readily applied to other settings or countries.

Other issues
For the two cases of delayed pneumothorax that were detected, the authors did not examine how the use of radiographs affected the treatment of patients, their health outcomes and cost consequences.

Implications of the study
These results should be verified by a trial based on a large sample which includes an experimental group and a control group. The use of routine chest radiographs after placement of subclavian venous catheters or the use of chest radiographs only if venipuncture is difficult or if the patient has an underlying medical disorder that will prevent tolerance of even a small pneumothorax should also be examined.

Source of funding
None stated.

Bibliographic details

PubMedID
9456941
DOI
10.2214/ajr.170.2.9456941

Other publications of related interest


Indexing Status
Subject indexing assigned by NLM

MeSH
Catheterization, Central Venous /adverse effects /methods; Cost-Benefit Analysis; Costs and Cost Analysis; Humans; Jugular Veins; Medicare /economics; Pneumothorax /etiology /radiography; Radiography, Thoracic /economics /utilization; United States

AccessionNumber
21998000208

Date bibliographic record published
31/05/1999

Date abstract record published
31/05/1999