Comparison of percutaneous transluminal coronary angioplasty outcome and hospital costs for low-volume and high-volume operators


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
High and low volume percutaneous transluminal coronary angioplasty (PTCA) procedures.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients due to undergo PTCA. The population included Asian, black, Hispanic and white individuals of both genders.

Setting
Hospital. The economic study was carried out in Los Angeles, California, USA.

Dates to which data relate
The main effectiveness data were extracted from a clinical trial conducted between March 1991 and February 1994. Resource and cost data were mainly derived from 1991-94 sources. The price year was not clearly stated.

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

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

Study sample
The study sample was a cohort of 2,204 patients who underwent PTCA. 2,350 PTCA performed between March 1991 and February 1994 by 38 physicians were analysed. Physicians were divided into 2 volume groups: high (> 50 cases/year) (1,502, 30.5% female) and low (<50 cases/year) (848, 31.8% female). The patient age was 65.2 (+/- 11) years in the high-volume group and 63.7 (+/- 11.1) years in the low-volume group. Power calculations to determine the sample size were not reported.

Study design
Cohort study. The duration of the follow-up was 3 years.

**Analysis of effectiveness**
The analysis of the clinical study was based on treatment completers only. The primary health outcomes used in the analysis were: hospital length of stay, hospital mortality, number of emergency CABG cases and waiting time.

**Effectiveness results**
The hospital length of stay was estimated to be 4.2 (+/- 4.5) days. There was estimated to be no significant difference in in-hospital mortality (p=0.6) and post-procedural hospital length of stay, (p=0.6). Patients treated by high-volume operators were estimated to be less likely to require emergency CABG (p=0.009), and experienced fewer procedural complications (p=0.065). The emergency CABG < 24 hours was 1.48% in the high-volume group and 3.76% in the low-volume group, (p=.001)

**Clinical conclusions**
PTCA performed by high-volume operators was significantly less likely to require emergency CABG and was also associated with lower hospital morbidity and shorter hospital length of stay.

**Measure of benefits used in the economic analysis**
The authors did not develop a summary measure of benefit. As such the benefits are assumed to be the same as the effectiveness results.

**Direct costs**
Costs rather than charges were used and were based on the hospital's accounting system (Transition System, Inc. Boston, Massachusetts). Significant risk factors associated with hospital costs were also analysed using linear regression and the Cox model. Quantities were analysed separately from costs. Discounting was not undertaken. The quantity/cost boundary adopted was the hospital. The price date was not stated.

**Currency**
US dollars ($).

**Sensitivity analysis**
No sensitivity analysis was performed.

**Cost results**
The hospital costs were $7,287 (+/- 4,791) and $7,948 (+/- 6,077) in the high-volume and low-volume group, respectively.

**Synthesis of costs and benefits**
Costs and benefits were not combined. The high volume operators were associated with some improvements in clinical outcomes at lower cost and can be considered to be the dominant strategy.

**Authors' conclusions**
PTCA performed by high-volume operators was significantly less likely to require emergency CABG and was also associated with lower hospital morbidity and shorter hospital length of stay and lower hospital costs. Findings are consistent with published guidelines which recommend 50 to 75 cases per year.
CRD COMMENTARY - Selection of comparators
The reason for the choice of comparator is clear. Higher primary operator case volume can improve the PTCA procedure. You, as a user of this database, should consider whether these are widely used health technologies in your own setting.

Validity of estimate of measure of benefit
The estimate of measure of benefit used in the economic analysis is likely to be internally valid. However, as stated by the authors, the study suffers from not considering the impact of severity of illness and coexisting health status which might result in either under-estimation or over-estimation of the importance of case volume. Furthermore, the validity of the study is questionable due to the unbalanced allocation of patients to the two groups (8 versus 30).

Validity of estimate of costs
The data have not been used selectively. Resource and cost data were analysed separately. Adequate details of the methods of quantity/cost estimation were given and important cost items were not omitted.

Other issues
The authors’ conclusions were justified. However, the issue of generalisability to other setting was not addressed, although, appropriate comparisons were made with other studies in terms of annual case volume and outcomes. The results were not presented selectively.

Implications of the study
Further research is required to correct correlations between patients who are treated by the same operator and to examine a "dose-response" effect.

Source of funding
None stated.

Bibliographic details

PubMedID
8602558

Indexing Status
Subject indexing assigned by NLM

MeSH
Aged; Angioplasty, Balloon, Coronary /economics /mortality /utilization; Coronary Artery Bypass; Coronary Disease /economics /surgery; Cost of Illness; Emergencies; Female; Hospital Costs; Hospital Mortality; Humans; Length of Stay; Male; Middle Aged; Outcome Assessment (Health Care); Risk Factors; Technology Assessment, Biomedical; United States /epidemiology

AccessionNumber
21996000282

Date bibliographic record published
Date abstract record published
31/03/1999