A comparison of Hickman line- and Port-a-Cath-associated complications in patients with solid tumours undergoing chemotherapy

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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.

CRD summary
The study investigated the economic and clinical impact of complications associated with Hickman lines versus Port-a-Caths in patients undergoing infusional chemotherapy for solid tumours. The analysis demonstrated that Port-a-Cath catheters were more effective (fewer complications) and less expensive than Hickman lines. Although the methods and results were presented satisfactorily, the study was based on a weak source of clinical and economic evidence. Thus, caution is required when interpreting the study results.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The aim of the study was to estimate the economic and clinical impact of complications associated with Hickman lines versus Port-a-Caths in patients undergoing infusional chemotherapy for solid tumours.

Interventions
The interventions under examination were two devices for insertion of infusional chemotherapy: Hickman lines versus Port-a-Cath.

Location/setting
UK/outpatient setting.

Methods
Analytical approach:
This economic evaluation was based on a retrospective analysis of patients’ charts at the authors’ institution, which reported the rates of complications, line removal, and resource use associated with the two devices under investigation. The time horizon of the analysis was related to the follow-up period, which corresponded to the day the device was removed, the occurrence of death, or the end of the study. The authors did not explicitly report the perspective of the study.

Effectiveness data:
All patients with solid tumours having either device inserted between October 2000 and March 2005 were included in the analysis. The study sample comprised 30 Hickman lines in 22 patients and 33 Port-a-Caths in 31 patients. The Hickman lines were in situ for a total of 3,539 days (median 83, range: 6 to 585). The Port-a-Caths were in place for a total of 5,783 days (median 158, range: 20 to 456). This difference was statistically significant. The authors stated that patients were well matched in terms of demographics, primary site and chemotherapy regimen. The main clinical end point was the rate of catheter-related complications such as infections, blockage and leakage.

Monetary benefit and utility valuations:
None.

Measure of benefit:
The summary benefit measure, which was not combined with the costs given the cost-consequences design, was the rate of complications. This was defined as the number of complications per 1,000 catheter-days. Other end points were time
to complication and line removal rate.

Cost data:
The analysis of the costs considered the costs of the devices. This was defined as the sum of the device purchase plus the costs of insertion, treatment of complications, catheter removal due to complication, and reinserter the catheter. The resource use data were based on the sample of patients included in the clinical study. Other details on sources of costs, price year and statistical analyses were not reported. The costs were in UK pounds sterling (£).

Analysis of uncertainty:
Not performed.

Results
The rate of complications was 5.09/1,000 catheter-days in the Hickman line group and 1.04/1,000 catheter-days in the Port-a-Cath group. Thus, the complication rate in Hickman lines was almost five times greater than that in Port-a-Cath, with a relative risk of 4.9 (confidence interval: 1.9 to 15.1, p=0.0003). Infection was the most common complication in both groups.

The range of time to complication was 1 to 304 days for Hickman lines and 1 to 132 days for Port-a-Caths.

The rate of removal was five times higher for Hickman lines: 4.52/1000 catheter-days versus 0.86/1,000 catheter-days, (p=0.0027).

The cost of insertion amounted to £1,512 per catheter for the Hickman line and £1,483 per Port-a-Cath.

Authors' conclusions
The authors concluded that Port-a-Cath catheters were more effective (fewer complications) and less expensive than Hickman lines in patients undergoing infusional chemotherapy for solid tumours.

CRD commentary
Interventions:
The authors provided a clear explanation for their choice of the two devices under examination, which were used at their own institution. They are also likely to be relevant in other settings.

Effectiveness/benefits:
The clinical evidence was based on a retrospective review of hospital records. This design is usually considered weak because of potential differences between patient groups (selection bias, confounding) and potential missing information in the charts. However, the authors stated that the two study groups were comparable with respect to baseline characteristics. Statistical analyses, such as power calculations, were not performed to demonstrate the appropriateness of sample size. Furthermore, the evidence came from a small group of patients in a single hospital, which may not have been representative of other patient groups. In general, the reporting of the assessment of clinical end points was good. However, the end points represent intermediate measures of the impact of the health interventions on patient health.

Costs:
The analysis of the costs was restricted to a few categories related to catheter insertion. The unit costs and quantities of resources used were not presented. The authors did not report the viewpoint of the analysis or the price year. Thus, there was little information on the cost analysis.

Analysis and results:
Owing to the cost-consequences framework, a number of primary and secondary clinical end points were measured and not combined with the costs. The issue of uncertainty was not addressed and the generalisability of the study results to other settings was not discussed, although the authors compared their results with those from other published studies that showed similar findings.

Concluding remarks:
There are a few limitations to study validity, which have arisen from the weak source of clinical data and the poor reporting of economic data. Overall, given the limitations, the authors’ conclusions should be considered with a degree of caution.

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