Economic evaluation of chlorhexidine-impregnated sponges for preventing catheter-related infections in critically ill adults in the Dressing Study
Schwebel C, Lucet JC, Vesin A, Arrault X, Calvino-Gunther S, Bouadma L, Timsit JF

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 examined the cost-effectiveness of chlorhexidine gluconate-impregnated sponges (CHGIS) for arterial and central venous catheters for prevention of catheter-related infections in critically ill adults using data from a recent clinical trial. The authors concluded that the CHGIS strategy reduced the rate of MCRI and saved costs from the perspective of an intensive care unit. The analysis was appropriately carried out using a micro-costing approach alongside a randomised controlled trial. The authors’ conclusions appear robust.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The study examined the cost-effectiveness of chlorhexidine gluconate-impregnated sponges (CHGIS) for arterial and central venous catheters for the prevention of catheter-related infections in critically ill adults using data from a recent clinical trial.

Interventions
The interventions were CHGIS versus no CHGIS (standard dressing). Also seven-day dressing change was compared against three-day dressing change.

Location/setting
France/intensive care unit.

Methods
Analytical approach:
The analysis was based on a decision tree model populated with data derived from a single study. A short-term horizon was considered. The perspective was that of the intensive care unit.

Effectiveness data:
Clinical data were taken from the Dressing Study, a prospective randomised controlled trial that was carried out in seven intensive care units (two medical, two surgical and three medical-surgical units) in three university and two general hospitals in France. This study compared seven- or three-day CHGIS versus seven- or three-day standard dressing. In total 1,636 patients were enrolled and followed until intensive care unit discharge. The risk of major catheter-related infections (MCRI) was the key input of the model. Bootstrapping was used to estimate confidence intervals (CIs) around expected MCRI rates.

Monetary benefit and utility valuations:
Not considered.

Measure of benefit:
No summary benefit measure was used. Rate of MCRI was the primary outcome.

Cost data:
The economic analysis was carried out alongside the clinical trial using a micro-costing approach that included the main...
cost categories: dressing (time per dressing, number of nurses and materials), treatment of contact dermatitis caused by CHGIS, diagnosis of catheter colonisation, treatment of MCRIs and additional length of stay. Resource quantities were taken directly from the Dressing Study. Unit costs were taken from selected participating hospitals. Costs were estimated in Euros then converted to and expressed in USA dollars ($). The price year was 2007.

Analysis of uncertainty:
One- and two-way sensitivity analyses were carried out to identify parameters that effected total costs such as MCRI rate, cost of MCRI and prevention effect of the CHGIS dressing.

Results
Using CHGIS significantly decreased the MCRI from 1.4 to 0.6 per 1,000 catheter days (hazard ratio 0.39, p=0.03). Changing dressing every seven days was not inferior to changes every three days (hazard ratio: 0.99).

Expected cost-savings per catheter compared to the reference strategy of three-day standard dressing were $197 with three-day CHGIS dressing, $133 with seven-day CHGIS dressing and $50 with seven-day standard dressing.

When considering only catheter-related bloodstream infections, the cost-savings over the standard approach were $117 with three-day CHGIS dressing, $98 with seven-day CHGIS dressing and -$5 with seven-day standard dressing.

Sensitivity analysis showed that the rate of MCRI was the key input of the model. The three-day CHGIS strategy was cost-saving when the baseline MCRI rate was higher than 0.141% (0.212% for the seven-day strategy).

Authors’ conclusions
The authors concluded that the CHGIS strategy reduced the rate of MCRI and saved costs from the perspective of an intensive care unit.

CRD commentary
Interventions:
The selection of comparators was appropriate to the proposed approach for the prevention of MCRI. Two scheduled changes were considered for both the new and standard approaches.

Effectiveness/benefits:
The analysis relied on the results of a published clinical trial, the main methods and results of which were reported. Generally, clinical trials are considered to be a valid source of evidence because of their methodological strengths, which should minimise selection bias. A large sample size was used and there was no loss to follow-up. More information might be found in the primary publication of the Dressing Study. The main endpoint of the analysis was an intermediate measure of the impact of the disease on patient health. Comparisons with the benefits of other health care interventions were not feasible.

Costs:
A micro-costing technique was used to estimate resource quantities that were collected accurately alongside a clinical trial. Details on methods adopted and items collected were provided and this represented a strength of the analysis. Unit costs were taken from a French hospital that was representative of the authors’ setting. Categories of costs included were in line with the perspective adopted in the study (intensive care unit). The price year was reported and this would facilitate reflection exercises. Only some costs were varied in the sensitivity analysis. Overall the economic analysis was conducted and reported satisfactorily.

Analysis and results:
The study results were selectively reported (only incremental findings were presented). Cost-effectiveness ratios were not calculated as a cost-consequences analysis was carried out. A deterministic approach was used to deal with the issue of uncertainty and focused on the most influential inputs. A bootstrapping approach was used to estimate confidence intervals around mean values. Some comparisons with other studies were made but were not fully discussed. The study results should be considered specific to the authors’ setting as both clinical and economic data were based on French patients.
Concluding remarks:
The analysis was carried out appropriately using a micro-costing approach alongside a randomised controlled trial. The authors’ conclusions appear robust.

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