Analisis de costo-efectividad de un programa preventivo de enfermedad vesicular en Chile
[Cost-effectiveness analysis of a screening program for gallbladder disease in Chile]
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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.

Health technology
Three screening strategies for gallbladder disease were studied:

universal ultrasound screening (UUS) for all women 40 years old and laparoscopic cholecystectomy for those with gallstones (elective intervention, EI), (strategy UUS/EI);

UUS for all women 40 years old and laparoscopic cholecystectomy for those with calculi of 3 cm or larger (high-risk intervention, HRI), (strategy UUS/HRI); and

selective screening (SS) for obese women, with a body mass index (BMI) of 27 or higher, and elective laparoscopic cholecystectomy for those with lithiasis (EI), (strategy SS/EI).

Type of intervention
Screening.

Economic study type
Cost-effectiveness analysis.

Study population
The study population consisted of high-risk 40-year-old women.

Setting
The setting was the community. The economic study was carried out in Chile.

Dates to which data relate
The effectiveness data were derived from studies published between 1983 and 2000. The price year was 1998.

Source of effectiveness data
The effectiveness data were derived from a review of the literature.

Modelling
A decision analytic model was constructed to assess the lifetime costs and outcomes of the three screening strategies and standard care, in a hypothetical cohort of 40-year-old Chilean women. The model assumed that approximately 45% of all 40-year-old Chilean women suffer from bladder calculi. The four resultant health states were no complication, presence of symptoms, severe complications (such as pancreatitis and colecistitis) and bladder cancer.
Outcomes assessed in the review
The outcomes assessed in the review were:

- the prevalence of bladder lithiasis;
- the relative risk of lithiasis given obesity;
- the risk of complications given lithiasis in asymptomatic or symptomatic patients;
- the risk of bladder cancer;
- the relative risk of bladder cancer given lithiasis of at least 3 cm;
- the prevalence of calculi of at least 3 cm in women with lithiasis;
- the relative risk of bladder cancer given obesity;
- the prevalence of obesity;
- the sensitivity and specificity of echographic examination for the detection of lithiasis or calculi of at least 3 cm;
- the mortality rate for complications unrelated to surgery;
- the 5-year survival rate associated with bladder cancer compliance rate with the screening programme; and
- the rates of mortality of laparoscopic cholecystectomy (LC) or open cholecystectomy (OC), complications, and conversions of LC into OC for both elective and non-elective surgery in difference age classes.

Study designs and other criteria for inclusion in the review
Not stated.

Sources searched to identify primary studies
The MEDLINE and HealthSTAR databases were searched for primary studies. Additional information was derived from the National Institute for Statistics in Chile.

Criteria used to ensure the validity of primary studies
Not stated.

Methods used to judge relevance and validity, and for extracting data
Not stated.

Number of primary studies included
The effective evidence was derived from 33 primary studies.

Methods of combining primary studies
A narrative method was used to combine the primary studies.

Investigation of differences between primary studies
Not stated.
Results of the review
The prevalence of bladder lithiasis was 0.45.

The relative risk of lithiasis given obesity was 1.2.

The yearly risk of complications given lithiasis ranged from 0.008 to 0.03 in asymptomatic patients, and was 0.015 in symptomatic patients.

The cumulative risk of bladder cancer was 0.0213.

The relative risk of bladder cancer given lithiasis of at least 3 cm was 3.

The prevalence of calculi of at least 3 cm in women with lithiasis was 0.15.

The relative risk of bladder cancer given obesity was 1.4.

The prevalence of obesity was 0.3.

The sensitivity of echographic examination for the detection of lithiasis was 0.90 and the specificity was 0.95. The corresponding values for detecting calculi of at least 3 cm were 0.8 (sensitivity) and 0.8 (specificity).

The mortality rate for complications unrelated to surgery was 0.0003.

The 5-year survival rate associated with bladder cancer was 0.08.

The compliance rate with the screening programme was 0.75.

In terms of elective surgery:

the mortality rates of LC were 0.09% in the age class 40 to 49 years, 0.09% in the age class 50 to 59, 0.12% in the age class 60 to 69, 0.9% in the age class 70 to 79, and 1% in the age class of 80 years and over;

the mortality rates of OC were 0.12% in the age class 40 to 49 years, 0.27% in the age class 50 to 59, 0.61% in the age class 60 to 69, 3% in the age class 70 to 79, and 3.1% in the age class of 80 years and over;

the complication rates were 0.05% with LC and 0.03% with OC; and

the conversion rate from LC into OC was 5%.

In terms of non-elective surgery:

the mortality rates of LC were 0.12% in the age class 40 to 49 years, 0.12% in the age class 50 to 59, 0.8% in the age class 60 to 69, 1.25% in the age class 70 to 79, and 1.5% in the age class of 80 years and over;

the mortality rates of OC were 0.48% in the age class 40 to 49 years, 1.8% in the age class 50 to 59, 2.4% in the age class 60 to 69, 5.5% in the age class 70 to 79, and 5.5% in the age class of 80 years and over;

the complication rates were 5.5% with LC and 5.5% with OC; and

the conversion rate from LC into OC was 20%.

Measure of benefits used in the economic analysis
The benefit measure used in the economic analysis was the number of life-months gained with each strategy. This was derived using the Kaplan-Meier method and from the decision model. The number of deaths avoided and cases of bladder cancer avoided were also derived from the decision model.
Direct costs
The cost/resource boundary of the analysis was that of the public provider of the screening programmes. The analysis included the costs of the screening interventions and the treatment of the disease. For example, diagnostic tests, primary care visits, hospital stay and surgery. The unit costs were given. The costs were estimated from FONASA data, which represented the reimbursement rates in Chile. The resource use was calculated on the basis of the experts' opinions. Discounting was irrelevant since the costs were incurred over less than two years, due to the short life expectancy of the patients included in the analysis. However, rates of 3 and 5% were used in the sensitivity analyses. The price year was 1998.

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

Indirect Costs
The indirect costs were not included.

Currency
US dollars ($). In July 1998, $1 = 468 pesos.

Sensitivity analysis
The robustness of the study results was determined by conducting one- and multi-way sensitivity analyses on the most critical variables used in the decision model. These included:

- compliance with the screening programme,
- the sensitivity and specificity of the diagnostic tests,
- the mortality rate associated with surgery,
- the prevalence of lithiasis,
- discount rates, and
- the mortality risk due to bladder cancer.

Pessimistic and optimistic scenarios were also assessed. Finally, an institutional source of cost data was used and compared with the FONASA data used in the base-case.

Estimated benefits used in the economic analysis
The number of life-months gained was 5.25 with strategy UUS/EI, 4.64 with strategy UUS/HRI, and 1.24 with strategy SS/EI.

There were 207 deaths with standard care, 63 with strategy UUS/EI, 77 with strategy UUS/HRI, and 170 with strategy SS/EI. Compared with the standard care, the percentage of deaths avoided was 69.5% with strategy UUS/EI, 62.8% with strategy UUS/HRI, and 17.8% with strategy SS/EI.

There were 213 cases of bladder cancer with standard care, 60 with strategy UUS/EI, 72 with strategy UUS/HRI, and 169 with strategy SS/EI. Compared with standard care, the percentage of cases of bladder cancer avoided was 71.8% with strategy UUS/EI, 66.2% with strategy UUS/HRI, and 20.6% with strategy SS/EI.
Cost results
The cost per patient was $107 with standard care, $186 with strategy UUS/EI, $164 with strategy UUS/HRI, and $157 with strategy SS/EI.

Synthesis of costs and benefits
An incremental cost-effectiveness analysis was carried out. The incremental cost per life-year gained with the interventions in comparison with standard care was $180 with strategy UUS/EI, $164 with strategy UUS/HRI, and $157 with strategy SS/EI. The results of the analysis were fairly robust to the variations examined in the sensitivity analyses. The strategy of UUS/HRI was the most convenient, while the source of the cost data was the variable that most greatly affected the estimated cost-effectiveness ratios.

Authors' conclusions
A universal screening programme for gallbladder disease proved to be a cost-effective intervention in a high-risk population, as it achieved significant benefits at a low incremental cost.

CRD COMMENTARY - Selection of comparators
Standard care was selected as the basic comparator, as it reflected the common practice for women at risk for gallbladder disease. You should assess whether a screening programme is currently implemented in your own setting.

Validity of estimate of measure of effectiveness
A systematic review of the literature was carried out and the sources searched were reported. However, it was not stated whether the authors took into account differences among the data derived from the primary studies. The design of the studies was not reported. Narrative methods were used to combine the effectiveness estimates.

Validity of estimate of measure of benefit
The benefit measure used in the economic analysis was the number of life-months gained with each screening strategy. This was appropriately obtained from the decision model.

Validity of estimate of costs
All the categories of costs relevant to the perspective adopted in the study were included in the economic analysis. The price year was reported and the impact of different discount rates was assessed. Sensitivity analyses were carried out on some cost variables included in the decision model and on the overall cost data. A complete breakdown of the costs was reported and the unit costs were given. The quantities of resources used were estimated on the basis of the experts' assumptions.

Other issues
The results were compared with those from other studies. The authors stated that their results could be generalisable to settings similar to that described in the present study. The results of the base-case and the sensitivity analyses were reported clearly. The authors stated that the main limitation was the lack of effectiveness evidence from randomised controlled trials. However, several sensitivity analyses were carried out. A population of women at risk for gallbladder disease was enrolled in the study and this was reflected in the conclusions of the analysis.

Implications of the study
The main implication of the study was that a screening programme for gallbladder disease should be carried out for 40-year-old women in Chile, due to the low incremental cost per life-year gained, as recommended by the World Bank. The study results could be used in other populations with high prevalence of the disease.
Source of funding
None stated.

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