Cost-effectiveness of 123I-FP-CIT SPECT in the differential diagnosis of essential tremor and Parkinson's disease in Italy

Antonini A, Berto P, Lopatriello S, Tamma F, Annemans L, Chambers M

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
This study examined the cost-effectiveness of single photon emission computed tomography (SPECT) using [iodine-123]N-ω-fluoropropyl-2β-carbomethoxy-3β-(4-iodophenyl)tropane (123I-FP-CIT) versus clinical judgement alone for differentiating between an essential tremor and Parkinson's disease. The authors concluded that 123I-FP-CIT SPECT was more effective and less expensive than clinical judgement for evaluating dopaminergic abnormalities in patients with clinically uncertain Parkinson's disease. The study had some methodological limitations, and further studies, using more valid clinical sources, are needed to corroborate these findings.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study examined the cost-effectiveness of single photon emission computed tomography (SPECT) using [iodine-123]N-ω-fluoropropyl-2β-carbomethoxy-3β-(4-iodophenyl)tropane (123I-FP-CIT) versus clinical judgement alone for differentiating between an essential tremor and Parkinson's disease. This work supported a formal submission for the reimbursement of 123I-FP-CIT SPECT in Italy.

Interventions
The diagnostic tool was 123I-FP-CIT SPECT and it was compared with clinical judgement alone, which was the usual care.

Location/setting
Italy/secondary care.

Methods
Analytical approach:
The analysis was based on a published Markov model with a five-year horizon. The authors stated that it was carried out from the perspective of the Italian National Health Service (NHS).

Effectiveness data:
The clinical evidence was estimated in two ways. Firstly, the authors selected some published sources for the data on the accuracy of 123I-FP-CIT SPECT and of clinical judgement. Secondly, a Delphi panel of 12 Italian neurologists, who represented the regions of Italy, the clinical settings (private and public), and the characteristics of the health care facilities, provided the remaining data for the mode, using a double-round procedure. The diagnostic accuracy of the two strategies was the key input to the model.

Monetary benefit and utility valuations:
Not considered.

Measure of benefit:
The summary benefit measure was potentially beneficial therapy-years (PBTYs) and these were discounted at an annual rate of 5%.
Cost data:
The economic analysis included the costs of diagnosis, medication, clinic visits, hospital admissions, and management of adverse events. The resource use data were from official sources and expert opinion. The prices were from a national database for medications, national ambulatory tariffs for the tests and examinations, and diagnosis-related group data for hospitalisations. All costs were in Euros (EUR), the price year was 2005, and a 5% annual discount rate was applied.

Analysis of uncertainty:
A deterministic, one-way, sensitivity analysis was undertaken to assess how robust the base-case findings were to variations in the model inputs. Expert opinion was used to define the ranges for these estimates.

Results
In the base case, the discounted expected costs were EUR 8,113 with clinical judgement and EUR 7,772 with SPECT and the PBTYs were 2.00 with clinical judgement and 3.68 with SPECT. The \(^{123}\text{I-FP-CIT SPECT}\) was dominant as it was less expensive and more effective than clinical judgement.

These results were robust to variations in the model inputs. The most influential input was the prevalence of parkinsonism, but SPECT remained dominant when the prevalence rate was 55% or less. At a parkinsonism prevalence of 60% the incremental cost per PBTY for SPECT over clinical judgement was EUR 264 and at 70% it was EUR 826.

Authors’ conclusions
The authors concluded that \(^{123}\text{I-FP-CIT SPECT}\), for the assessment of dopaminergic abnormalities, in patients with clinically uncertain Parkinson's disease, generated clinical benefits and cost savings from the perspective of the Italian NHS.

CRD commentary
Interventions:
The rationale for the selection of the comparators was clear, as the two strategies were both feasible tools for the diagnosis of Parkinson's disease. Clinical judgement appears to have been the standard care in Italy.

Effectiveness/benefits:
The authors did not report a systematic search to identify the relevant sources of data and they did not clearly describe the published sources used for the diagnostic accuracy. This makes it impossible to objectively judge the validity of the clinical inputs. The Delphi panel introduced further uncertainty in the clinical data, but it appears that this was necessary due to a lack of valid published data. The benefit measure was disease specific and was of clinical relevance, but might not be comparable with the benefits of other health interventions. The authors stated that the use of effectiveness measures or quality-adjusted life-years (QALYs) as benefit measures would have introduced further uncertainty as there was lack of utility data for patients with Parkinson’s disease.

Costs:
The categories of costs were relevant to the perspective of the Italian NHS. The unit costs were not reported, but some data on resource quantities were given. The costs were appropriately separated into those incurred in the first six months and those incurred subsequently. The resource use was mainly estimated by the Delphi panel, which appears to have been representative of several Italian regions. The cost estimates were treated deterministically, but alternative estimates for only a few items were considered in the sensitivity analysis. Other details, such as the price year and the discount rate, were reported.

Analysis and results:
The results were clearly reported. The costs and benefits were appropriately synthesised in an incremental analysis. A clear description of the decision model was provided. The authors stated that the time horizon of five years was appropriate as it was long enough to capture the relevant outcomes of the two diagnostic strategies. The issue of uncertainty was investigated, using a deterministic approach, which considered variations in the model inputs, one at a time. A more comprehensive approach would have been more appropriate. The authors acknowledged that the main limitation of their analysis was the lack of prospective data for most of the clinical inputs.
Concluding remarks:
The study had some methodological limitations, and further studies, using more valid clinical sources, are needed to corroborate these findings.

Funding
Funded by a grant from GE Healthcare, formerly Amersham Health.

Bibliographic details

PubMedID
18785639

DOI
10.1002/mds.22278

Original Paper URL

Indexing Status
Subject indexing assigned by NLM

MeSH
Analysis of Variance; Cost-Benefit Analysis /economics; Diagnosis, Differential; Essential Tremor /economics /radionuclide imaging; Evaluation Studies as Topic; Humans, Italy; Parkinson Disease /economics /radionuclide imaging; Tomography, Emission-Computed, Single-Photon /economics /methods; Tropanes /economics /metabolism

AccessionNumber
22009101108

Date bibliographic record published
18/08/2010

Date abstract record published
03/11/2010