The cost effectiveness of $^{123}$I-FP-CIT SPECT imaging in patients with an uncertain clinical diagnosis of parkinsonism

Van Laere K, Everaert L, Annemans L, Gonce M, Vandenbergh W, Vander Borght T

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 $^{123}$I-$\omega$-fluoropropyl-2-$\beta$-carboxymethoxy-3$\beta$-(4-iodophenyl)nortropane ($^{123}$I-FP-CIT) single photon emission computed tomography (SPECT) added to the conventional workup, in patients with clinically uncertainty parkinsonism. The authors concluded that the inclusion of $^{123}$I-FP-CIT SPECT was a cost-effective strategy from the perspective of the Belgian health care system. The study had some limitations in the reporting of the published sources, but was strengthened by the inclusion of real-life data in a secondary analysis. The authors’ conclusions appear to be valid.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to examine the cost-effectiveness of $^{123}$I-$\omega$-fluoropropyl-2-$\beta$-carboxymethoxy-3$\beta$-(4-iodophenyl)nortropane ($^{123}$I-FP-CIT) single photon emission computed tomography (SPECT) added to conventional workup in patients with clinically uncertain parkinsonism or essential tremor.

Interventions
The intervention was SPECT imaging of the dopamine transporter using $^{123}$I-FP-CIT for the early diagnosis of neurodegenerative parkinsonism. This diagnostic strategy was compared against a diagnostic pathway in which no scan was performed.

Location/setting
Belgium/out-patient.

Methods
Analytical approach:
A Markov model was developed to determine the costs and benefits of the two diagnostic strategies over a period of five years. The authors stated that the analysis was carried out from the perspective of the Belgian health care payer.

Effectiveness data:
The clinical evidence was derived from a selection of known, relevant studies and supplemented by expert opinions from a Delphi panel of 13 Belgian neurologists and nuclear medicine specialists, using a postal two-round design. No details on the design of the published studies were given. The key clinical input was the disease prevalence. In an alternative analysis, the key input data (scan accuracy, disease prevalence, and changes in treatment due to scan results) were taken from the real-life patterns in a nationwide registry of 1,701 consecutive Belgian patients.

Monetary benefit and utility valuations:
Not included.

Measure of benefit:
The benefit of the intervention was expressed as adequately treated years (ATYs), which were discounted at an annual rate of 5%.
Cost data:
The economic analysis included out-patient and in-patient costs related to diagnosis and treatment, including the cost of $^{123}$I-FP-CIT. A breakdown of the cost items was provided for most categories. Most of the resource use data and unit costs were based on estimates by the Delphi panel. The cost of $^{123}$I-FP-CIT was based on the official price list. All costs were in Euros (EUR) and the price year was not reported. Future costs were discounted at 5% per annum.

Analysis of uncertainty:
A deterministic sensitivity analysis was undertaken on the key model inputs, such as prevalence of disease, rates of adverse events, and withdrawal from therapy.

Results
At an assumed neurodegenerative parkinsonism prevalence of 53%, over five years, the strategy including $^{123}$I-FP-CIT increased costs by EUR 121 and led to a gain of 1.301 ATYs over the conventional strategy, resulting in an incremental cost per ATY gained of EUR 92.7.

The base-case results were quite stable and the most influential model input was the disease prevalence. The cost-effectiveness of $^{123}$I-FP-CIT varied from dominant (more effective and less costly) at a prevalence of 40% to EUR 624.7 per ATY gained at a prevalence of 66%.

The registry analysis showed that the use of $^{123}$I-FP-CIT would alter patient management in 49% of patients. Using data from this registry on disease prevalence and accuracy, the incremental cost per ATY gained rose to EUR 358.

Authors' conclusions
The authors concluded that the inclusion of $^{123}$I-FP-CIT SPECT in the diagnostic workup of patients with uncertain parkinsonism was a cost-effective strategy from the perspective of the Belgian health care system.

CRD commentary
Interventions:
The selection of the comparators was appropriate as the new diagnostic tool was added to and compared with the conventional strategy in the authors’ setting.

Effectiveness/benefits:
The clinical estimates were derived from multiple sources. The published sources were not extensively reported; no details of the design and other characteristics were provided, which limits the possibility of objectively assessing the validity of the clinical estimates. Most of the inputs were based on expert opinion and were not tested in the sensitivity analysis. However, in a secondary analysis, the clinical inputs were based on data from a large Belgian registry, which was representative of the population analysed. The benefit measure would be difficult to compare with the benefits of other health care interventions, but it might be relevant for this patient population.

Costs:
The economic analysis was consistent with the perspective in terms of the cost categories. The unit costs were reported for most items, but no data on the patterns of resource consumption were given. All the economic data were based on expert opinion, and these inputs were not tested in the sensitivity analysis. An official price year was not reported, which reduces the possibility of replicating the results in other time periods.

Analysis and results:
An incremental approach was appropriately used to combine the costs and benefits, which were clearly reported. The issue of uncertainty was only partially investigated and was based on a deterministic analysis. A more comprehensive analysis would have been better, given the extensive use of expert opinion to derive the model inputs. The details on the structure and pathways of the decision model were clearly reported.

Concluding remarks:
The study had some limitations in the reporting of the published sources, but was strengthened by the inclusion of real-life data in a secondary analysis. The authors’ conclusions appear to be valid.
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