Enzyme Replacement Therapy: Cerezyme in Egyptian Pediatric Patients with Type 1 Gaucher Disease

Health Technology Appraisal
Issued: April 2015

- **بيانات المستحضر محل الدراسة:**

Intervention	Cerezyme (imiglucerase)
Company name	Genzyme corporation
Comparator	Best supportive care

- **الهدف:**

تقييم الدراسة الإقتصادية لتحليل الاثار المترتبة على ميزانية الدولة بعد ٣ سنوات لدخول مستحضر Cerezyme لعلاج Gaucher disease. وذلك لضمان أفضل النتائج العلاجية بالنسبة للمريض وبأقل تكلفة ممكنة من خلال الإلتزام بالخطوط العلاجية الاسترشادية العالمية وفي ضوء الممارسة الإكلينيكية المحلية.

- **توصية لجنة اقتصاديات الدواء:**

وقد أسفرت الدراسة عن ان مستحضر الـ Cerezyme يؤثر على ميزانية الدولة وذلك عند مقارنته ب best supportive care بعد ثلاثة سنوات. كما أسفرت الدراسة أيضا عن ان التكلفة الإجمالية للفئة المستهدفة لمستحضر الـ Cerezyme للمريض الواحد شهريا ٣١٩٣٠ جنيه مصري بعد ثلاثة سنوات ، مع الاخذ فى الاعتبار نسبة الفئة المستهدفة (٧٩ مريض) لمستحضر Cerezyme

علما انه بالبحث في المراجع العلمية تبين وجود علاجات أخري ليست متداولة في مصر وإنما تتوافر في دول اخري وتمتاز بنفس الفعالية العلاجية ولكن بسعر أقل. كذلك فإن الدراسة العلمية التي تم البناء علي نتائجها في عمل الدراسة الاقتصادية والتي أجريت علي المرضي المصريين لم تقدم الدليل العلمي الكافي. كما أنه من الناحية الإكلينيكية فإن الدواء محل الدراسة يقلل الأثار المرضية ولكن ليس له قيمة علاجية علي الجهاز العصبي لانه "not pass blood brain barrier".

- وعليه توصي لجنة اقتصاديات الدواء بدعم المستحضر بموافقة مشروطة وهي إعادة إجراء الدراسة في السنوات القادمة بمقارنة بالعلاجات الأخري التي تقدم نفس الفعالية بعد تقديم عروض الاسعار من الشركات الأخري.

- علما ان الدراسة التي قامت باجرائها وحدة اقتصاديات الدواء شملت بيانات التكلفة الخاصة بالمستحضر التي تم تجميعها من المستشفيات الجامعية بالاضافة إلى باقي التكلفة المرتبطة بالإقامة بالمستشفى والأدوية والتبعات المحتملة عن علاج الاثار الجانبية لاستخدام كل بروتوكول على حدة.

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English Summary:

Budget Impact Analysis of Imiglucerase versus Best Supportive Care in Egyptian Pediatric Patients with Type 1 Gaucher Disease

- **Introduction**

Rare diseases are life threatening or chronically debilitating, complex conditions with a prevalence of < 5 per 10,000. Over the last years, the interest of pharmaceutical companies in these disorders has grown, due to new legislation related to orphan drug development implemented in the US in 1983 and in Europe in 1999. [1]

Gaucher disease, a rare disorder with a prevalence of around 1 in 70,000, is a lysosomal storage disorder that results from defective activity of the lysosomal enzyme glucocerebrosidase . Storage of glucocerebroside in macrophages gives rise to hepatosplenomegaly, severely debilitating bone disease and, in rare cases, central nervous system involvement [2]. There are three broad phenotypic categories, defined by the absence of neurological disease in type I or the presence of neurological disease and the rate of progression into fulminant type II and subacute, chronic type III Gaucher disease [3].

Long term complications and associated conditions of Gaucher disease include splenectomy, persisting bone complications, pulmonary hypertension [4], parkinson disease [5] and an increased risk of associated malignancies including multiple myeloma (MM) and hepatocellular carcinoma (HCC) [6,7]. The recent paper showed that long term enzyme replacement therapy for Gaucher disease can effectively reduce the incidence of splenectomy and bone complications, and will most likely result in a reduction in the risk of developing malignancies.

The high cost of this treatment has been a debate in the past and has set the benchmark for similar enzyme replacement therapies, the increasing impacts on healthcare budgets of the growing number of orphan medicinal products have resulted in an increasing interest in an economic evaluation [8].

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Objective

The aim of this study was to conduct budget impact analysis of imiglucerase enzyme versus best supportive care in type 1 gaucher disease patients.

- **Economic evaluation Key Features:[9]**

Key Features:	
year of the document	April 2015
Affiliation of authors	Pharmacoeconomic Unit, Central Administration For Pharmaceutical Affairs
Purpose of the document	Conduct budget impact analysis of imiglucerase enzyme versus best supportive care in type 1 gaucher disease patients.
Standard reporting format included	Yes
Disclosure	Yes
Target audience of funding/ author's interests	Public, Healthcare Industries
Perspective	Societal perspective
Indication	Treatment of pediatric patients with type 1 gaucher disease (deficiency of glucocerebrosidase enzyme).
Target population	Those who are insured and not insured by the Egyptian health care system.
Subgroup analysis	No subgroup analysis was performed.
Choice of comparator	Best supportive care.
Time horizon	Penetration over a 3 year.
Assumptions required	yes
Analytical technique	Budget impact analysis
Costs to be included	Direct medical costs only included and include the cost of therapy, and the cost of AEs treatment, cost of lab tests done for monitoring.
Source of costs	Tender department from MOH hospitals.
Modeling	Budget impact model.
Systematic review of evidences	yes
Preference for effectiveness over efficacy	yes
outcome measure	Budget impact per member per month (PMPM) was measured for both interventions.

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Preferred method to derive utility	Utility wasn't incorporated as it is a budget impact model, only costs are included.
Equity issues stated	Not performed.
Discounting costs	No discounting was done in budget impact model.
Discounting outcomes	No discounting was done in budget impact model.
Sensitivity analysis-parameters and range	Critical component(s) in the calculation is varied through a relevant range or from worst case to best case.
Sensitivity analysis-methods	One-way sensitivity analysis is performed.
Presenting results	Cerezyme has a high budget impact.
Incremental analysis	Not done
Total costs vs. effectiveness (cost/effectiveness ratio)	Not done
Portability of results (Generalizability)	The generalizability and extent to which the clinical efficacy data and the economic data are representative is identified and discussed.

Committee Discussion

The significance of ERT provision for the national health care budget is not just a matter of costs per QALY gained, but also a matter of demand for health care, given that Gaucher disease is rare. Whether society is willing to pay more for treatments of rare disorders than for more prevalent diseases is uncertain so the main objective of this study is to conduct budget impact analysis of imiglucerase enzyme versus best supportive care in type 1 gaucher diseased patients.

No clinical outcomes were measured in budget impact analysis, only costs are added. The final result expressed as EGP/ PMPM (per member per month) and then budget impact over 1 , 2 , and 3 years is calculated according to the best estimate of drug penetration pattern in the Egyptian market .The budget increase over 3 years was EGP 90,053,141.36 and the budget impact per member per month was EGP 0.03 and the budget impact per treated member per month was EGP 31,664.26 which represent a very high budget impact .

The inputs of budget impact analysis were taken from clinical trial "Enzyme replacement therapy and bony changes in Egyptian paediatric Gaucher disease patients "which enrolled 22 child from Egypt who were genotyped and phenotyped prior to commencing ERT with Cerezyme (imiglucerase). Rate of bone lesions formation and bone pain was measured and compared pre and post ERT administration.

The main point of strength for this budget impact model is that its inputs parameters were taken from study performed on Egyptian patients so differences due to genetic factors or other characteristics due to race are diminished.

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One of limitations of this study is that the study includes a small sample size of the studied cohort for the non-randomized study. The structure of the model was simplified to reflect the course of the Gaucher disease and many assumptions was made to estimate some model parameters due to lack of local data.

One-way sensitivity analyses of various parameters were performed and showed that the key driver of the results were the total no of population and the no of patients eligible for the treatment; these parameters have the major impact on the analysis results.

- **Conclusion**

Cerzyme has high budget impact equal 0.03 L.E / PMPM (per member per month), and the total budget impact for 79 patients (targeted patients) equal 31930 L.E over 3 years.

- **Declaration of interest**

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

- **Appraisal Committee members**

Each technology appraisal is appraised by the PE Committee, which is one of CAPA's standing advisory committees and consist of members who represent different specialties such as statistics, clinical evidence, economics, medicine, clinical pharmacy and pharmacoeconomics. A list of the Committee members who took part in the discussions for this appraisal appears below:

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- **PEU project team**
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  - **Asmaa saad,** Team member of Pharmacoeconomic Unit, Central Administration for Pharmaceutical Affairs, Ministry of Health.

- **References:**

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