

Direct medical cost related to the management of pemphigus: A pilot Tunisian study

Coût médical direct lié à la prise en charge du pemphigus : Etude pilote Tunisienne

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ABSTRACT

Background: Pemphigus is a therapeutically challenging disease with high morbidity and economic burden. First-line prescription of rituximab remains limited in Tunisia due to its high cost. Systemic steroids remain the standard of care but are associated with a major risk of morbidities and higher treatment costs.

Aim: To assess the direct medical costs of pemphigus in Tunisia.

Methods: Retrospective estimation of direct medical costs during the 18 months following the diagnosis using the “bottom-up approach” in the Dermatology Department of Hedi Chaker Hospital, Sfax, Tunisia.

Results: Total medical costs were estimated at 38745.7 €, with an average cost of 1 210 € per patient and per year: paraclinical investigations (46%), medical treatment (30%), hospitalization (21%) and outpatient visits (3%). The average cost was the highest in the age group of 15-24 years (1553 €). Treatment costs related to corticosteroid-induced morbidity were estimated at 1208 €.

Conclusions: The management of pemphigus in Tunisia needs to be adapted to take into account the health economic analysis in order to reduce overall disease costs and the burden of steroid-induced morbidities.

Key words: Pemphigus, Tunisia, Cost, Corticosteroids.

RÉSUMÉ

Introduction: Le pemphigus pose un défi thérapeutique avec une morbidité et une charge économique élevées. La prescription du rituximab en première ligne reste limitée en Tunisie en raison de son coût élevé. La corticothérapie systémique reste le traitement de base aux dépens d'un risque élevé de morbidités cortico-induites et d'une majoration des coûts.

Objectif: Evaluer le coût médical direct du pemphigus en Tunisie.

Méthodes: Estimation rétrospective du coût médical direct durant les 18 mois suivant le diagnostic du pemphigus dans le service de Dermatologie du CHU Hédi Chaker, Sfax, Tunisie en adoptant la méthode ascendante.

Résultats: Le coût médical total était estimé à 38745,7 € avec un coût moyen de 1 210 € par patient et par an : investigations paracliniques (46%), traitement médical (30%), hospitalisation (21%) et visites ambulatoires (3%). Le coût moyen le plus élevé était noté dans le groupe d'âge de 15-24 ans (1553 €). Les coûts des traitements consacrés à la prise en charge des morbidités cortico-induites étaient de 1208 €.

Conclusions: La prise en charge du pemphigus en Tunisie doit être adaptée pour tenir compte de l'analyse économique afin de réduire le coût total de la maladie et la charge des morbidités cortico-induites.

Mots clés: Pemphigus, Tunisie, Coût, corticoïdes.

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INTRODUCTION

Pemphigus is a frequent autoimmune bullous disease in Tunisia affecting 6.7 patients per million inhabitants per year (1). Management is challenging with significant rates of morbidity and mortality. The advent of rituximab has improved the prognosis of the disease and reduced its economic burden. Prescription of the monoclonal antibody remains limited in Tunisia due to its high cost. Treatment is essentially based on the long-term use of systemic steroids and immunosuppressive drugs with a high incidence of steroid-induced morbidities(1,2). An increase in the total medical costs is consequently expected. The evaluation of the economic burden of pemphigus in Tunisia remains underestimated due to the lack of health economic analysis.

The present study was carried out to estimate the direct medical costs of pemphigus in Tunisia.

METHODS

A monocentric retrospective study was conducted in the Dermatology Department of Hedi Chaker University Hospital in Sfax, Tunisia. Over a five-year period (January 2015-December 2019), the direct medical costs were estimated during the 18 months following the diagnosis of pemphigus. A bottom-up approach was used: the volume of care consumed for each management component was multiplied by the corresponding unit cost (accommodation, outpatient consultations, complementary biological and radiological examinations, diagnostic procedures, care, and treatment). For prescribed treatments, the fees proposed in the Tunisian Therapeutic Formulary were applied(3). The cost of outpatient consultations was estimated based on the fee schedule for Patient Care in Public Health Care Structures established by the Ministry of Health and the Ministry of Finance(4). Paraclinical examination costs were estimated based on the General Nomenclature of Professional Acts provided by the Ministry of Health(5). The burden of common complications (diabetes, hypertension, dyslipidemia, infections, osteoporosis) was also considered. The national currency of Tunisian Dinar (TD) was used to estimate the direct medical costs of pemphigus. An average exchange rate of 1 Euro € = 3.2 TND was used. An annual discount rate of 3% was applied(6).

RESULTS

Thirty-two cases were studied with a mean age of 44±14.5 years. Female predominance was observed with an adjusted sex ratio F/H of 2.5. The demographic and clinical characteristics of the included patients are represented in Table 1.

Table 1. Demographic and clinical characteristics of patients

Sex	Males	9 (28%)	
	Females	23 (72%)	
Age (years)	15-24	2 (6%)	
	25-34	7 (23%)	
	35-44	6 (19%)	
	45-54	9 (29%)	
	≥55ans	7 (23%)	
Type of pemphigus	Vulgaris	9 (28%)	
	Vegetans	4 (13%)	
	Seborrheic	14 (44%)	
	Foliaceous	3 (9%)	
	Herpetiformis	2 (6%)	
Medical Treatment	Attack phase	Corticotherapy	25 (78%)
		Corticotherapy-immunosuppressants	6 (19%)
		Corticotherapy- dapsone	1 (3%)
	Maintenance phase	Corticotherapy	16 (50%)
		Corticotherapy-immunosuppressants	14 (44%)
		Corticotherapy -dapsone	2 (6%)
Form of the disease	Uncomplicated:	7 (22%)	
	Complicated:	Infections: 22 (69%)	
		Diabetes: 8 (25%)	
		Dyslipidemia: 3 (9%)	
		High blood pressure :1 (3%)	
Ostéoporose :1 (3%)			

The total direct medical costs of pemphigus were estimated at 38 745.7 €, with an average cost per patient and per year of 1210 €. Paraclinical investigations accounted for the majority of the costs (46%) reaching a budget of 17 779.5 €. Prescribed therapies followed with 30% of the total costs and an amount of 11,798.1 €. During the study period, a total of 51 hospitalizations were recorded with a median of 15.5 days. Total charges for hospital stay were estimated at 8074.3€. A total of 350 consultations were registered with an average of 10. Fees of outpatient visits accounted for 3% of the total costs. Medical costs related to the management of pemphigus are represented in Table 2.

Table 2. Costs of pemphigus management

Management component	%	Total costs (€)	Average cost (€)
Paraclinical investigations:	46%	17 779.5	555.6
Biologic investigations		16 436	
Radiologic investigations		1 107.6	
Histological examination		125.1	
Others		110.6	
Medical treatment	30%	11 798.1	368.7
Hospital stay	21%	8 074.3	252.3
Outpatients' visits	3%	1 093.7	34.18
Total medical costs		38 745.7	1 210

In our study, average costs were highest in those aged less than 34 years. In this category, the age groups of 15-24 years and 25-34 years presented with a financial estimate of 1553 € and 1486 € respectively (Figure 1).

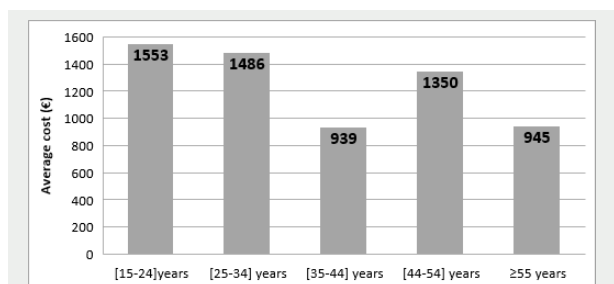


Figure 1. Average costs of pemphigus according to the age groups: patients aged 15-24 years were associated with the highest cost of 1553€

With a budget of 2 357.5 € per patient, the average cost of pemphigus foliaceus was 33% higher than that of pemphigus vulgaris. This difference was not statistically significant ($p = 0.6$). Distribution of direct medical costs according to pemphigus type are represented in Table 3.

Table 3. Management costs by type of pemphigus

Pemphigus type	Total cost (€)	Average Cost (€)
Deep pemphigus:	19 129	1 471.4
Pemphigus Vulgaris	15 901	1 766.7
Pemphigus Vegetans	3 228.1	807
Superficial pemphigus:	18 000	1 058.8
Seborrheic pemphigus	10 927.5	780.5
Foliaceous pemphigus	7 072.5	2 357.5
Pemphigus Herpetiformis	1617	808.5

Complicated forms of pemphigus accounted for 78% of the cases. The cost of treating corticosteroid-induced morbidities (diabetes, hypertension, dyslipidemia, infections, and osteoporosis) was estimated to be 1,208€. The average cost per patient was 448.2 € and was five times higher than the cost of treating an uncomplicated form of the disease (84.7 €).

DISCUSSION

Our analysis of the medical cost of pemphigus represents a pilot study in Tunisia. It highlights the high financial burden of pemphigus in our country with an average annual medical cost of 1,210 €. Health economic analyses of the disease have been performed worldwide(7–11). The main objective was to compare the cost of rituximab with the cost of conventional treatment. Despite its proven efficacy, the high cost and the difficulty of reimbursement of anti-CD20 drugs limit their prescription in Tunisia. Our estimation of the medical cost is higher than those reported in Hungary (830 €) and India (216.9 €) (9,10). However, it remains lower than that reported by Hebert et al in France (4665 €)(7). This could be explained by the high cost of the immunoglobulin infusions and by the burden of other complications that were not taken into account in this series. At the national level, the average cost of pemphigus exceeds the average discounted cost of tuberculosis, estimated at 747.8 €(12). This underlines the importance of the economic burden of this autoimmune bullous dermatosis in Tunisia. In our series, the 15-24 age group represented only 6% of

the sample studied and was associated with the highest average cost, estimated at 1,553 €. The 25-34 age group was in second place with an average cost of 1.486 €. Our study thus consolidates the economic analysis carried out by Brodsky et al, where younger age is significantly associated with a higher economic burden(10). Indeed, an increase in age by one year is associated with a 2.8% decrease in costs(10). This could be explained by a more severe presentation of the disease in younger patients. On the other hand, pemphigus foliaceus was associated in our series with a 33% increase in costs compared to pemphigus vulgaris. This difference did not reach statistical significance, possibly due to the small sample size of our series. Paradoxically, in Hungary, the direct medical costs of pemphigus vulgaris are twice as high as those of pemphigus foliaceus, with a 102.5% increase in total costs. The peculiarities of foliaceous pemphigus in Tunisia, with a high frequency of corticosteroid dependence and relapses, may explain this inversion of the economic burden according to the type of pemphigus(1,13). Paraclinical investigations represented the primary expense in our study. The high cumulative dose of systemic steroids and the high risk of corticosteroid-induced complications could explain this close and costly biological monitoring observed in our series, mainly in young patients(14). On the other hand, the cost of the prescribed treatments was the second largest item of expenditure. The relatively moderate economic burden of corticosteroids and immunosuppressants explains their prolonged prescription for most patients. However, the high cost of managing corticoid-induced morbidity outweighs the relative benefit. Our study consolidates data in the literature on the economic burden of managing the morbidities of corticosteroid therapy(15,16). In the United States, sepsis and metabolic morbidities associated with steroids cost an additional \$ 9914 and \$ 5411 per day, respectively(16,17). The limited duration of our study and the restricted number of registered morbidities underestimate the true burden of conventional treatment complications. Moreover, the estimation of direct medical costs underestimates the real economic burden of the disease. The retrospective nature of the study, small sample size, and lack of updated medical costs since 1996 are the primary limitations of our research. The indirect costs due to absenteeism, psychological suffering, pain, and early mortality, although they are difficult to estimate, are still significant. Conversely, in a study conducted in France, the cost of steroid-induced complications was reported to be halved in patients treated with rituximab compared to those treated with corticosteroids alone(7). Thus, managing the disease in our country should take into account the results of health cost analysis. Additional multicentric and prospective economic analyses are necessary for accurate estimates of national costs. The impact of early prescription of rituximab on overall costs should also be assessed in Tunisia in order to determine the possible economic benefit in patients with pemphigus.

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