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Trends in diabetes-related lower extremities amputations in Romania—A five year nationwide evaluation

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ABSTRACT

The aim of the study was to perform a nationwide evaluation of the frequency, incidence and trends of diabetes-related LEA (lower extremities amputations) in Romania. We have retrospectively analysed DRG data (ICD 10 AM codes) from all hospitals in the country, over a 5 year period (2006–2010). Knowing the shortcomings of this approach, we have assumed that our study can serve as a platform for future comparisons. The total number of non-traumatic diabetes related LEA procedures was 24,312, they were performed in 16,873 patients with diabetes, 22.55% with type 1 diabetes, 70.26 with type 2 diabetes and 7.19% with non-specified diabetes at discharge. The total number of hospital admissions for these patients was 46,985. During the five years of the study there was an increase in the absolute number of major amputations (above the ankle), as well as of minor amputations. The rate of amputations decreased in type 1 diabetes, from baseline (2006): −8.15% in 2007, −25.83% in 2008, −23.43% in 2009, −27.71% in 2010, whereas it increased in type 2 diabetes in the respective years: 16.96%, 60.75%, 66.91%, and 104.64%, due to an increase in minor amputations and mainly in elderly people. Male: female amputations rate was 2:1 in type 1 diabetes patients and 2.4:1 in type 2 diabetes patients. This study, the first of its kind in the Romanian population, offers a starting point for future comparisons and identifies a target for preventive measures.

1. Introduction

Diabetes related lower extremities amputations (LEA) impose a significant burden on patients' health, quality of life and medical costs. Prevention measures should be widely available and targeted specifically according to the available international [1,2], and national guidelines [3,4] and permanently adapted to individual needs. Any attempt to achieve the historic objectives stated since 1989 by The St Vincent Declaration [5] at national or local level is necessarily preceded by a baseline evaluation. The fact that incidence of LEA are the main marker of the quality of foot care in diabetes is well known [6,7] and the preventive measures should be initiated as early as possible and should first address structured educational efforts for both patients and health care providers. The present study represents the first nationwide assessment of trends, frequency and incidence of diabetes related LEA in Romania, over a 5 years period.

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2. Methods

We have retrospectively analyzed all diabetes related LEA performed in the country during a hospital admission between 1st of January 2006–31st of December 2010. All hospitalizations were from public, state-run health institutions. Starting from 2005 all the hospitals reported using the DRG (disease related groups) coding system and data were centralized by the National School for Public Health, Management and Health Education (Scoala Nationala de Sanatate Publica, Management si Perfectionare in Domeniul Sanatatii) [8] which was our data provider.

The DRG coding system used throughout the country during the study period was the ICD 10 (International Classification of Diseases 10) for diagnostics and ICD 10 AM v.3 for procedures [9].

The selection criteria for the national database search were: presence of a primary or secondary DRG diagnosis codes for diabetes (E09–E14) at discharge, and at least one of any amputation procedure codes of the following: 1484–44,367.00 for thigh amputations, 1484–44,370.00 for hip amputations, 1532–1533 for toes and feet amputations, 1505–44,367.02, for leg amputations.

The total (absolute) number of patients, hospital admissions and procedures/patient was assessed every 6 months and was summarized in report tables for groups of patients according to type of diabetes, age decades, sex. Due to confidentiality reasons, identification data were encrypted. Simultaneous data on diabetes type, sex and age (decades between 20 and 90 years), were available only for years 2008, 2009, 2010 and were reported separately for different DRG diabetes types. The associated co-morbidities were selected by choosing the most frequently reported DRG diagnostic codes at discharge for all patients (I10, I25.9, I50.0, I48, I69.3, A41.9, I70.24, E66.9, I50.9, Z89.6, I25.2, R02, I25.8, E66.0, E78.2, I25.5, I70.20, I25.6, N18.90, A41.8, I77.6, Y83.5, and Z89.5). Demographic data for the Romanian population was obtained from the annual reports of the National Institute of Statistics [10]. Diabetes related officially reported data were accessed from the same source and presented 538,648 persons with diabetes for 2008, 703,324 for 2009 and 747,721 for 2010 [11,12], data were not available for years 2006 and 2007. The massive increase in number of people with diabetes from 2008 to 2009 is due to a nationwide government funded screening programme, which included diabetes mellitus among other chronic disorders [13].

Descriptive statistics (absolute numbers) was performed. Statistical analysis was performed with SPSS 19.0 and STATISTICA 8.0.

3. Results

The total number of diabetes related amputations nationwide over the five years study period was 24,312 and the procedures were performed in 16,873 patients with diabetes mellitus. 22.55% of these patients had type 1 DRG coded diabetes and 70.26% had type 2 DRG coded diabetes, the remaining 7.19% were patients with non-specified types of DRG diabetes diagnosis at discharge. The total number of hospital admissions for these patients over the study period was 46,985.

The absolute number of episodes of diabetes related LEA performed each year, during the study period is presented in Table 1. Jeffcoate et al. [6] suggest that reporting the number of amputations may be expressed as number of LEA in persons with diabetes or in general population, which can be a more stable indicator. Crude incidence of diabetes related LEA (/100,000 persons in general population and in persons with diabetes) is also shown in Table 1.

We found a mean of 4584.4 (±612.42) amputations/year. The number of amputations performed in patients with diabetes increased by a mean rate of 7.94%/year. We found a mean of 1.44 amputations (procedures)/patient and 2.78 hospital admissions/patient during the study period. The data on total number of non-traumatic amputations was available only for year 2010, when 47.62% of all LEA were diabetes related.

The mean number of LEA/year of studied period were 1628.8 ± 240.7 in type 1 diabetes patients and 3066.0 ± 854.6 in type 2 diabetes patients.

Although an increase in number of amputations was noted over the five years period, it was due to an increasing number of amputations in type 2, but not in type 1 diabetes where the number actually decreased (Fig. 1). Variation of number of amputations (%) from baseline (2006) for type 1 diabetes was: −8.15%, −25.83%, −23.43%, −27.71% (decreasing) for years 2007, 2008, 2009, 2010, whereas for type 2 diabetes they were respectively: 16.96%, 60.75%, 66.91%, and 104.64% (increasing).

The prediction for the number of amputation episodes between 2006–2010 (60 months) by semester in patients with

Table 1 – Absolute number, crude incidence and level of amputations stratified by year.

	2006	2007	2008	2009	2010	Total
Absolute number of amputations	4123	4343	4927	5092	5827	24,312
Incidence of diabetes related amputations/100,000 persons/year in general population*	18.15	19.07	21.56	22.23	25.52	–
Incidence of diabetes related amputations/1000,000 persons/year in patients with diabetes*	–	–	914.69	723.99	779.30	–
Absolute number of minor amputations	2904	3137	3535	3769	4351	17,696
Absolute number of major amputations	1219	1206	1392	1323	1476	6616
Rate of minor to major amputations	2.38	2.60	2.54	2.85	2.95	2.67

* Data source on population of Romania for every year of the study period was the official data published by the National Institute of Statistics.