FEATURE ARTICLE

ESTIMATES OF HOSPITAL BASED EMERGENCY DEPARTMENT VISITS DUE TO DENTAL IMPLANT FAILURES IN THE UNITED STATES

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ABSTRACT

Objective

Objective of the current study is to provide nationally representative estimates of hospital based emergency department (ED) visits attributed to dental implant failures in the United States.

Methods

The Nationwide Emergency Department sample for the years 2008–2010 was used. All ED visits with a diagnosis of "dental implant failures" were selected for analysis. Patient demographics were examined. Outcomes of interest included disposition status following the ED visit and ED charges.

Results

During the study period, a total of 1200 ED visits were due to dental implant failures. Most ED visits with dental implant failures occurred among those aged <18 years (22.4% of all ED visits) followed by those aged 70 years and above (18.2%). Males comprised 53.7% of all ED visits. Close to 89% did not have any other chronic co-morbid conditions. Osseointegration failure of dental implant occurred in 31.7% of patients while post-osseointegration mechanical failure of dental implant occurred in 30.4% of patients. Following an ED visit, 82.8% were discharged routinely and 13.3% of patients were admitted as in-patients into the same hospital following the ED visit. The mean ED charge per visit was $1167.

Conclusions

Highest proportions of these ED visits were comprised of those aged <18 years, those aged 70 years and above, and male patients. The inherent limitations of NEDS database and lack of data elements precluded us from establishing an association between patient related factors and risk of ED visits due to implant failures.

INTRODUCTION

Throughout the world, the introduction of dental implants into clinical practice has positively impacted the way clinical dentistry is practiced today. The high success rate associated with dental implants enhanced its acceptability both by patients and clinicians leading to its wide spread incorporation into dental practice.[1] Though dental implants are highly predictable (with a success rate in the upper 90%), with the increasing number of implants being placed by

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clinicians with varying experience, the dental community is noticing a surge in the number of complications associated with its use.[2] The complications that lead to implant failure can be of biological (microbial origin) or mechanical (occlusal disharmony) origin, resulting either in progressive bone loss around implants or fracture of implant components.[3] In the case of implant failure, removal of implant will be the only option left for clinicians which has financial, psychological and esthetic implications.

Our group and several others have reported earlier that a large number of patients resort to emergency departments (ED) in the hospitals for their dental needs.[4] We reported in our earlier publications that a significant number of patients with common preventable oral conditions such as periodontal disease, dental caries, or pulpal conditions visited ED for treatment.[5-7] A portion of these patients were subsequently hospitalized, leading to a substantial increase in the overall cost of the treatment.[4] This is a major public health crisis that is creating a huge financial burden in the health care system. Since these are preventable conditions, it further questions the access to preventive care in these patient populations and the importance of training medical teams to diagnose and properly treat dental conditions in hospital settings.

Due to the rise in dental implant related complications, we aimed to do an exploratory analysis using the largest nationally representative publicly available database to determine the number of ED visits made by patients primarily for dental implant failures in the U.S. in the years 2008, 2009 and 2010.

MATERIALS AND METHODS

Study Design and Database Description

The current study is a descriptive retrospective analysis of the Nationwide Emergency Department Sample (NEDS).[8] NEDS data for the years 2008–2010 was used. NEDS is the largest, nationally representative, all-payer hospital based emergency department database in the United States. NEDS provides information on ED visits across the country and was created to examine ED utilization patterns. In the year 2010, 28 states contributed to the NEDS sample. Each year, information on close to 130 million nationally weighted ED visits are made available through NEDS. NEDS facilitates analyses of all types of ED visits and has been designed to study relative uncommon events. Stratification of the NEDS sample is based on geographic region, trauma center designation, urban-rural location of hospital, teaching hospital status, and hospital ownership/control. The present study was granted Institutional Review Board (IRB) exempt status by the Human Subjects Protection Office of the College of Dentistry – The University of Iowa. IRB protocol number is 201407833. A data-user agreement was completed with Healthcare Cost and Utilization Project – Agency for Healthcare Research and Quality (HCUP-AHRQ) prior to obtaining and analyzing the NEDS data. As per data-user agreement, individual cell counts ≤ 10 cannot be reported. In accordance with this, such low individual cell counts are not presented in the current study. The term "DS" (discharge information suppressed) has been used to designate low individual cell counts.

Selection of Cases

All ED visits with ICD-9-CM diagnoses codes for dental implant failures were selected for analysis.[9] The ICD-9-CM codes used included: 525.71 (Osseointegration failure of dental implant), 525.72 (Post-osseointegration biological failure of dental implant), 525.73 (Post-osseointegration mechanical failure of dental implant), and 525.79 (Other endosseous dental implant failure).

Outcomes

Outcomes examined in the current study included disposition status following ED visit by the patients (routine discharge, transfer to another short-term hospital, other transfers: includes skilled nursing facility/intermediate care facility/another type of facility, discharged against medical advice, died in ED, admitted as in-patient into same hospital, and unknown destination) and hospital ED charges. The present study used data from 3 years. All hospital ED charges were inflation adjusted to year 2010 levels using the Bureau of Labor Statistics inflation rates for hospital care.[10]

Patient Characteristics

Characteristics of patients examined in this study included age of patient, sex, co-morbid burden (based on Charlson co-morbid severity index),[11] insurance status (Medicare, Medicaid, private insurance, uninsured, or other insurance plans), and annual household income levels. Household income levels were based on the zip-code of the residence and vary annually. Four quartiles (low to high) were used to describe the income levels.

Analytical Approach

The current study is a descriptive analysis of the NEDS database. Simple descriptive statistics (frequencies, mean, median, and standard errors of mean) were used to summarize the characteristics of patients and ED charges. Each individual ED visit was the unit of analysis and the NEDS stratum was the stratification unit. Descriptive statistics were summarized using SAS Version 9.3 software (SAS Institute, Cary, NC).

RESULTS

During the study period (years 2008–2010), a total of 1200 ED visits were due to dental implant failures. Characteristics of patients are summarized in Table 1. Most ED visits with