ORIGINAL ARTICLE

A Demographic Study of Lower Limb Amputees in a North Indian Tertiary Rehabilitation Center

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Abstract

Introduction: Rehabilitation of amputees is a challenging in a developing country like India because in order to provide better rehabilitative facilities and to formulate specific rehabilitation guidelines, efficient record keeping and proper analysis of data are essential. Records of different epidemiological parameters of amputees are rarely found in Indian medical literature, which warrants an investigation for the same.

Aim and objective: To assess the age, sex, and cause-wise distribution of the amputees in the study group and to correlate the incidence of revision amputation with that of bad stumps and the level and cause of amputation.

Materials and methods: Retrospective data analysis of 132 patients with 141 lower limb amputations above the level of ankle admitted in the inpatient setting from 2015 till 2018 was performed. Upper limb amputees and amputations below the level of ankle were excluded.

Results: One hundred and thirty-two patients with lower limb amputations were taken, of which 123 (93.18%) were unilateral and 9 (6.82%) patients were bilateral, with 110 males (83.3%) 22 females (16.66%) overall. In the trauma group, there was a strong preponderance for young males (64.22%) with a mean age of 32.49 $\pm$ 12.62 years among unilateral and 26.5 $\pm$ 7.78 years.

Conclusion: Our study determined that young males are the biggest victims of traumatic amputations, much of it which could be preventable by implementing better road safety measures and avoiding hazardous activities. As there are very limited data available regarding amputee rehabilitation in existing literature, this study will help in future meta-analytical studies to formulate strategies to alleviate the socioeconomic burden of amputations.

Keywords: Amputee, Male, Revision amputation, Trauma.

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Introduction

Amputation is one of the oldest surgical procedures characterized by surgical removal or loss of extremity or part of extremity due to underlying disease or trauma. About 30 million amputees are residing in low-income countries. Every year 23,500 amputees are added to the amputee population in India, of which 20,200 are males and 3,300 are females.[1] There has been an increase in the incidence of amputations in the modern era, the prolongation of life and with improvement of transportation facilities.[2]

Rehabilitation of amputees is challenging as well as rewarding because lower-extremity amputations have a great impact on the psychological and physical well-being, the mobility, and the social life of individuals. In order to provide better rehabilitative facilities to the patients, efficient record keeping and proper analysis of such data are essential. Records of different epidemiological parameters of amputees from India are rarely found medical literature (PubMed, Medline search). Currently, advanced technologies are being utilized that are bringing on huge change in terms of rehabilitative prostheses, in view of which understanding the present scenario and profiles of amputees in specific areas of India is very much important. Data analysis of amputees attending the PMR department of the largest hospital of Uttar Pradesh is presented in this article.

Aim and Objective

The aim of this study was to find out the profile of amputees admitted for rehabilitation in the Department of PMR, KGMU from 2015 to 2018.

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The primary outcome measure was to assess the age-, sex-, and cause-wise distribution of the amputees and the secondary outcomes measure was to correlate the incidence of revision amputation with that of bad stumps and the cause of initial amputation.

Materials and Methods

This retrospective observational study was performed in 132 persons with 141 lower limb amputations patients admitted for rehabilitation in the Department of Physical Medicine and Rehabilitation (Regional Artificial Limb Center) in King Georges Medical University between January 2014 and December 2018.

Hospital records were examined for primary database and data extraction was performed.

All lower limb amputees with primary amputation above the level of ankle joint admitted for rehabilitation services during the specified period were included. All other cases including upper limb amputations, or any patient with incomplete records were excluded.

Results

Out of the 132 patients with lower limb amputations, 123 (93.18%) were unilateral and 9 (6.82%) patients were bilateral, with 110 males (83.3%) and 22 females (16.66%).

Out of 123 unilateral amputees, 101 were males (82.11%) and the remaining 22 (17.88%) were females. Mean age among males was 34.84 ± 13.90 years and among females was 36.45 ± 18.32 years.

Cause-wise, among the 101 males 49 primary amputations (48.51%) were due to road traffic accidents (RTAs), 21 (20.79%) were due to train accidents, 9 (8.91%) were due to industrial machine injuries. That is, there were total 79 cases of trauma (78.21%). The mean age of the trauma group was 32.49 ± 12.62 years.

Twelve (11.88%) primary amputations were due to peripheral vascular diseases, nine (8.91%) were postinfection, and one (0.99%) was due to burn injuries. That is, 22 primary amputations had non-traumatic etiology. The mean age of the non-trauma group was 43.27 ± 14.97 years.

Among the 22 female unilateral amputees, 5 (22.72%) were due to RTA, 3 (13.63%) were due to train accidents, 1 (04.54%) due to industrial machine injury, overall only 9 cases were due to trauma (40.9%) while non-traumatic causes like postburn 3 (13.63%), postinfection 3 (13.63%), peripheral vascular disease 2 (9.09%), malignancy 3 (13.63%), and congenital absence (1) were the majority, 12 in all (54.54%).

Overall percentage of RTAs among all patients was 41.6%.

Among the 101 unilateral male amputees, 70 (69.30%) were transtibial (TT) while the remaining 31 (30.69%) were transfemoral (TF) amputees. Out of the 70 TT male amputees, 21 (30.00%) had bad stump at the time of admission, 16 (22.85%) required revision of amputation. Out of these 16 patients requiring revision amputation, 10 (62.50%) had bad stump at the time of admission. Out of the 31 male TF amputees, 13 had bad stump at the time of admission, 15 requiring revision of amputation 11 of which were from the bad stump group.

Of the 22 female unilateral amputees, only 5 were due to TF amputation and the rest 17 were TT. Only 5 (22.72%) were due to RTA.

Out of the nine bilateral amputees all patients were male, mean age being 30.11 ± 10.74 years; train accident was the commonest cause five (55.6%), followed by infection in two (22.2%), and gangrene and RTA in one (11.1%) each.

Six patients needed bilateral TT amputation except three cases of train accidents needing TF in one leg.

Out of these 18 stumps in bilateral cases, 7 (38.9%) were bad stumps at the time of admission. Out of these seven bad stumps, three (42.85%) were due to train accidents, three (42.85%) were postinfection cases, and one each due to RTA and gangrene.

No complications in 118 out of 141 limbs, who were admitted for gait training of which the median duration of hospital stay is 11 days. Out of the 88 unilateral traumatic amputations, 76 (86.36%) had no complications and perfect prosthetic checkout. Out of the six bilateral traumatic amputations, only one patient had problems with prosthetic fitment in one stump.

Discussion

Trauma was the main cause behind primary amputation in this series. Epidemiological data of amputees in the Indian population are rare in existing literature. A meta-analysis conducted by AIIMS, New Delhi on psychological stress of amputees finds documented records on amputees.[3] In a service dedicated for diabetic foot and vascular diseases, 81 planned amputations were performed in one and a half year in a center in Kozhikode.[4] After studying the causes of amputation in young men from Illinois, USA, Lambert and Sciora[5] found that trauma was the most common, accounting for 52% of all amputations. Later, Warren and Kihn[6] reported that 76% of 1,964 amputees who received treatment at the Veterans Administration Hospital had undergone amputation because of vascular insufficiency. Still later, Stewart and Jain[7] reported that the majority of amputations in Scotland, UK, were caused by peripheral vascular disease, especially arteriosclerosis. Hence, it is possible to conclude that, in developed countries, the most common cause of amputation is vascular. However, the situation is different in the Asian countries. A number of smaller studies from India, Pakistan, and Nepal have indicated trauma to be the primary cause of amputation.[8–12]

Our study highlights the fact that majority of the amputees seeking rehabilitation were young males and victims of RTA and train accident. As high as 78 unilateral and 6 bilateral amputations in our series was due to trauma, mostly young individuals.

A similar study carried out in the same institution from 2012 to 2015 by Kumar et al. found out that trauma (43.75%) was the most common cause of initial amputation followed by infection (28.12%) and peripheral vascular disease (12.25%).[13] In our study, trauma (i.e., RTA, train accidents, and machinery accidents) constituted 71.21% of the population, which was even more (Figs 1 and 2).

This trend correlates with the overall trends of RTAs in India, detailed data of which are available, with as high as 85.2% of RTA-related deaths and 81.1% RTA-related injuries having happened to males in 2013. Also, the study predicts a worsening of road safety conditions in India in the years to come.[2]

Amputation at younger males due to traumatic causes is a huge social and economic burden on the society. A study by Gururaj in 2008 states that just RTA-related injuries and deaths, majority being in the 15–44 age groups account for a 3% loss in the national GDP awareness regarding road safety and is necessary, awareness

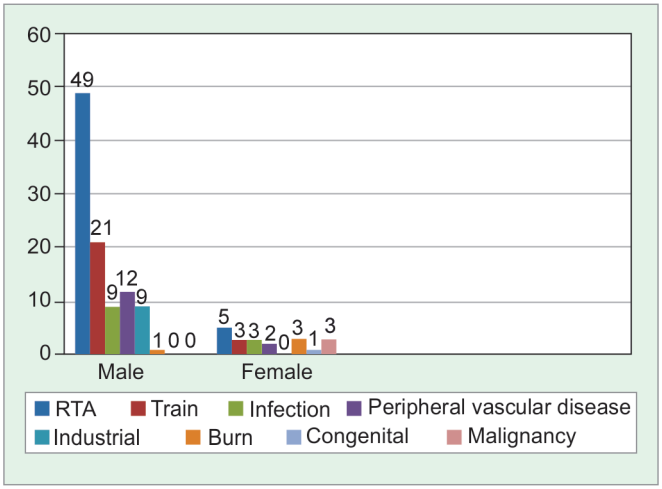

Fig. 1: Cause- and sex-wise distribution in unilateral amputees

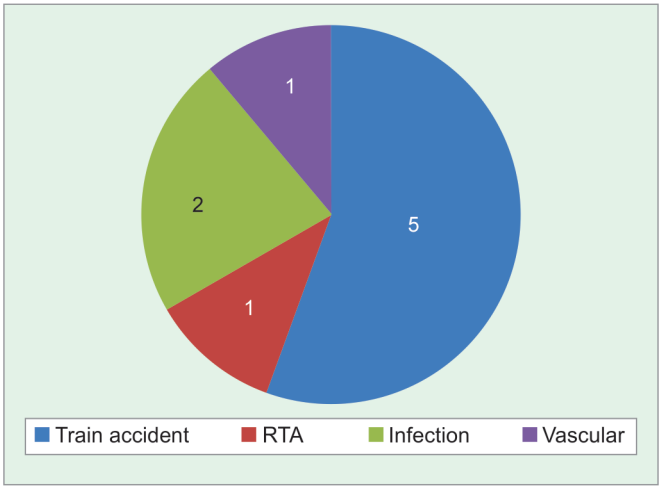

Fig. 2: Cause-wise distribution of cases

regarding scope of rehabilitation is also necessary to reduce the socioeconomic burden.[14]

Forty-seven (33.33%) of the stumps were bad stumps at the time of admission. This highlights the huge need of revision surgery in primary amputation. On the contrary, success of prosthetic rehabilitation in traumatic amputation was excellent. Out of the 88 unilateral traumatic amputations, 76 (86.36%) had no complications and perfect prosthetic checkout. Out of the six bilateral traumatic amputations, only one patient had problems with prosthetic fitment in one stump.

Train accident victims were particularly prone to develop bad stump. It is notable that in our study all the train accident victims were run over by moving trains while crossing railway tracks on foot, and were not due to collisions between trains. Severe nature of injury in train accidents may be cause of this high rate of bad stumps. Previous study also observed high rate of need of revision surgery in trauma-related amputation.

There was not a single case of diabetic TT or TF amputation, as most of these patients undergo amputation below the level of ankle and were excluded in our study.

Conclusion

Our study determined that young males are the biggest victims of traumatic amputations, much of it which could be preventable by implementing better road safety measures and avoiding hazardous activities. As there are very limited data available regarding amputee rehabilitation in existing literature, this study will help in future meta-analytical studies to formulate strategies to alleviate the socioeconomic burden.

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