

Epidemiological study of 1368 cases of surgical repair for traumatic peripheral nerve injury.

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Abstract

Background: Traumatic injury of the peripheral nerves should be treated in specialized centres. This study presents the epidemiological data of 1368 consecutive patients operated for peripheral nerve injuries beside the Service of neurosurgery, Department of Neurosciences, UHC "Mother Theresa", Tirana. In order to obtain the necessary data for this study we revised the clinical records, surgical registers and pre, intra and postoperative photo/video of the cases operated for peripheral nervous system injuries. A data recording program of the surgery cases was built *ad hoc*, categorizing the cases according to several variables. The data collected from the operated cases were manually inserted to be processed by the program. Results of informatics elaboration of the data were obtained, reviewed and categorized by: age, gender, type of trauma, localization of injury and type of nerve repair.

Future studies to be conducted in this field will focus in determining the level of nerve injury, time from the injury to intervention, distance from the site of trauma to the effector organ. The data will build necessary information for data mining, which based on these important factors that influence the result of nerve repair, will be useful for the prediction of the result in new patients harbouring peripheral nerve injury before undergoing surgery.

Keywords: peripheral nerve, trauma, data mining, repair

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Introduction

Traumatic injury of the peripheral nerves has been long treated with surgery in specialized centres. This study presents the epidemiological data of 1368 consecutive operated cases at the Neurosurgery Service, Department of Neurosciences, UHC "Mother Theresa", Tirana.

The aim of this retrospective study is to analyse data from surgical cases operated for peripheral nerve injury, perform an epidemiological analysis and create a database that will be used in the future studies of this field, as well as help to predict the progress of new cases that will be subject to nerve repair surgery.

In order to obtain the necessary data for this study, clinical records, operator registers and case files for peripheral nervous system injuries, have been revised thoroughly.

A data recording program of the surgery cases has been established, whereby the data processing is performed accurately and in real time, categorizing the cases according to several variables.

The program was designed to perform epidemiology analysis of 1368 cases. The data collected were manually inserted in the program, so as to be processed by the program. The results obtained were then reviewed and categorized by: *age, gender, type of injury, localization of injury and type of nerve repair.*

Methodology

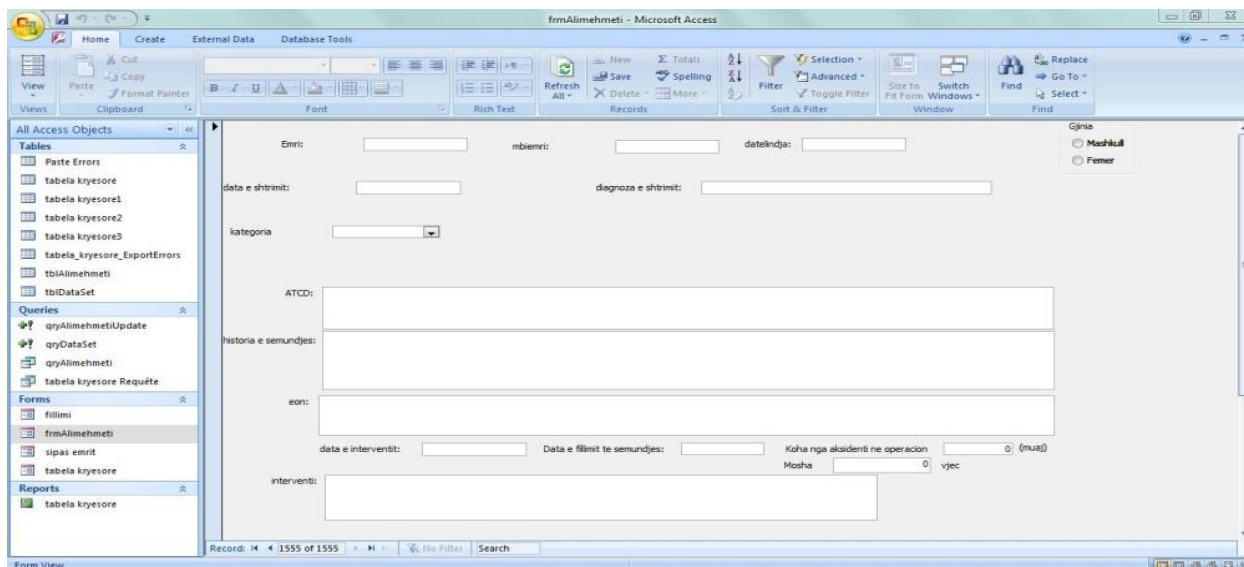
The image shows a screenshot of a Microsoft Access form titled 'frmAlimehmeti'. The interface includes a ribbon with tabs for 'Home', 'Create', 'External Data', and 'Database Tools'. On the left, the 'All Access Objects' pane shows a list of tables (e.g., 'tabela kryesore1', 'tabela kryesore2'), queries, forms, and reports. The main area of the form contains several input fields: 'Emri:' (Name), 'mbiemri:' (Surname), 'date lindja:' (Date of birth), 'data e shtrimit:' (Date of admission), 'diagnoza e shtrimit:' (Admission diagnosis), 'katgoria:' (Category), 'ATCD:' (ICD code), 'historia e semundjes:' (Medical history), 'eoni:' (Age), 'data e interventit:' (Date of intervention), 'Data e fillimit te semundjes:' (Date of onset of disease), 'Koha nga aksidenti ne operacion:' (Time from accident to operation), 'Mosha:' (Age), and 'vjec:' (Age). There are also radio buttons for 'Gjinia' (Gender) with options 'Mashkull' (Male) and 'Femer' (Female). The status bar at the bottom indicates 'Record: 1555 of 1555' and 'No Filter'.

Figure 1: View of the program for recording and analyzing the data.

Results

- **General:**

A total of 1368 cases were subjected to surgical interventions for peripheral nerves, out of which 346 cases were

traumatic, or at a rate of 25.2%. Figure 2 shows the distribution of the operated cases in the period 2006 – 2017 per each year. Only the cases with full record were included in this study. The patients lacking important information mentioned above were excluded from this study.

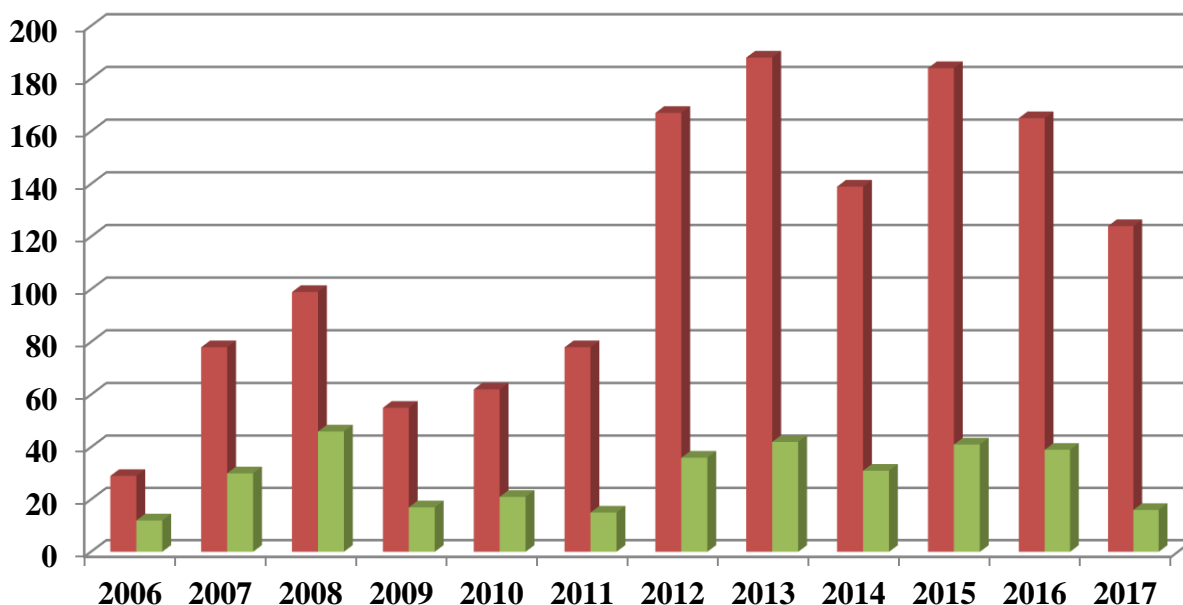


Figure 2: Distribution of operated cases according to annual report

Figure 2 shows that the highest number of traumatic cases assisted was in 2008, where 46 cases harbouring nerve injury out of 99 peripheral nerve cases were treated (46.5% of cases were traumatic). The ratio of general number of operated cases for peripheral nerve to those operated for nerve injury has been recorded to be the lowest in the year 2006 (31.04%) and the highest in the year 2013 (21.97%). In the last year studied, therefore, in 2017 there was a decrease in

the number of traumatic cases where only 12.9% (16 cases) were traumatic.

- **Age:**

The age of the patient cases included in the study varies from 4 months old to 71 years old. The median age 35.3 (3) years of age and the mean age was 32.2 years.

- **Gender:**

In traumatic cases studied were 80 females and 266 males.

- **Type of injury:**

In the studied cases it was noted that the major cause of peripheral nervous injury was cutting with sharp objects that constituted 41% of the cases. The results obtained from the analysis of the data are presented in the diagram below *Figure 3*:

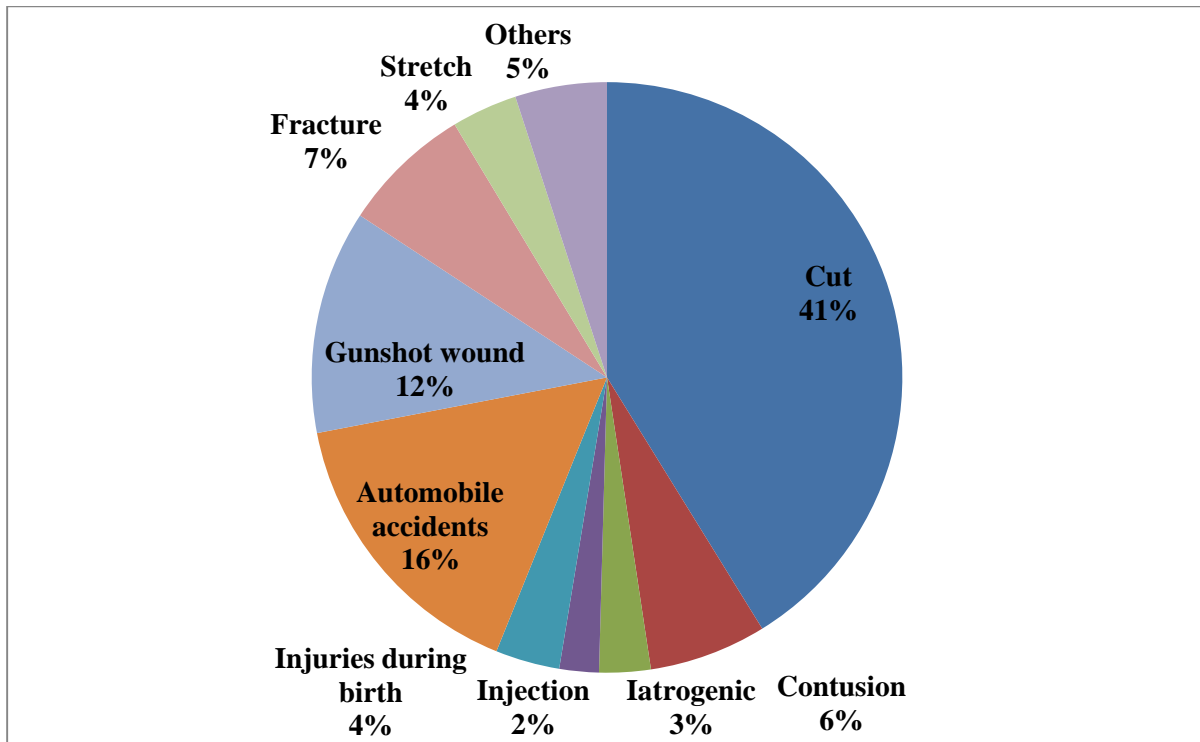


Figure 3: Distribution of cases according to modality of trauma.

Another major cause, apart from cutting with sharp objects, was automobile accidents and injuries from gunshot with respectively 16% and 12% of traumatic cases (n=22 for accidents and n=17 for gunshot wound). It is also important to mention that during our study we came across with cases that was with birth trauma, approximately 3.5%.

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- **Location of injury:**

The cases were analysed and grouped into three groups; in traumatic cases affecting the superior extremity, those affecting the inferior extremity and the trauma of the brachial plexus. The results obtained are presented in the *Figure 4*:

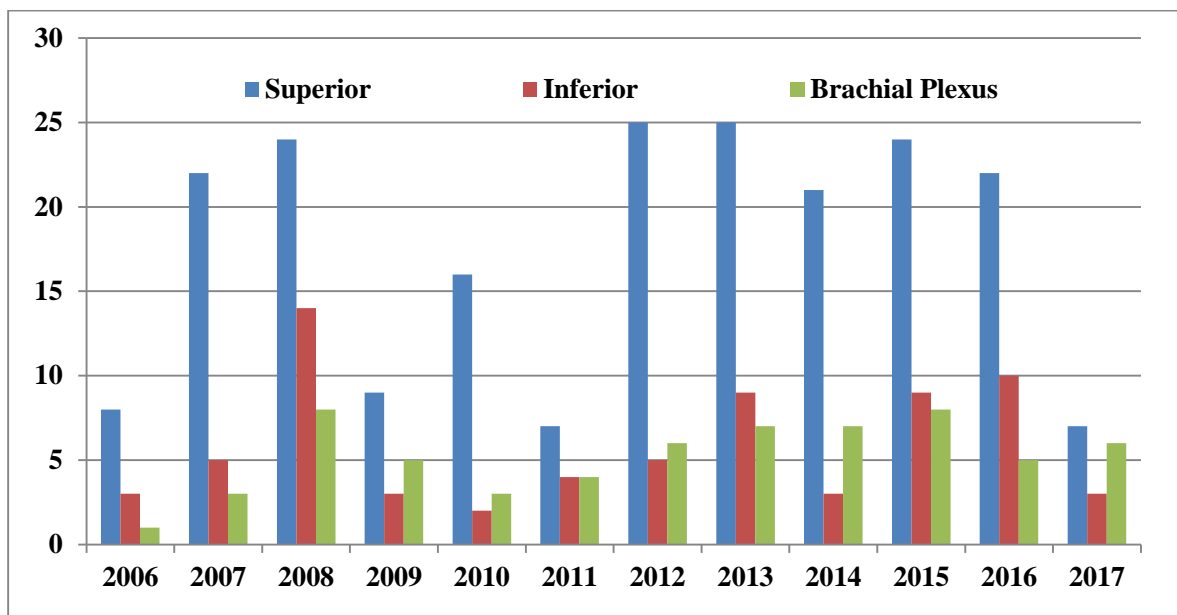


Figure 4: Distribution of cases according to location of trauma

After categorizing the cases according to the affected area, we investigated further in detail to see the nerves involved in these areas. From this analysis of the data we gained the following results:

a. The most common affected nerve in the superior extremity was *ulnar* nerve in 120 cases, followed by *median* nerve in 82 cases and *radial* nerve in 46 cases;

b. In the inferior extremity the most commonly affected nerve resulted to be the *ischiatric* nerve which was represented by 35 cases, followed by *peroneal* nerve in 26 cases. Other nerves were least affected

selectively by trauma (*tibial* nerve - 8 cases, *femoral* nerve 2 cases, etc).

- **Types of repair interventions:**

The importance of this study also rely on evidencing the type of the surgical repair on the injured nerve(s) implemented in the treatment of these trauma cases.

From the analysis of the data we obtained the following results as presented in the graph below Figure 5:

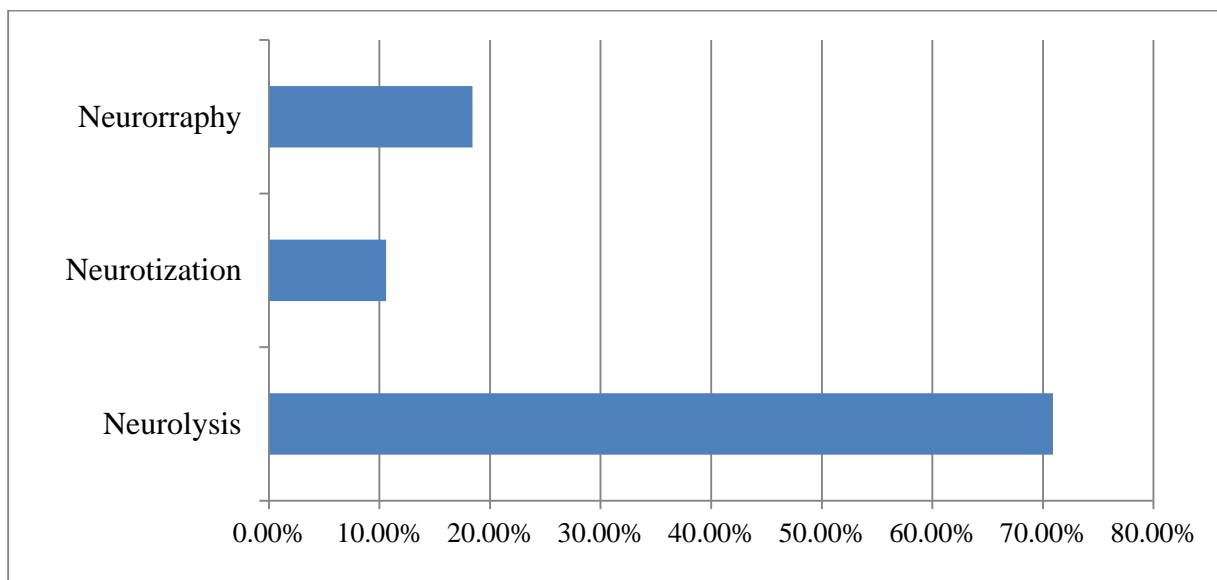


Figure 5: Types of repair interventions

Neurolysis was practiced in 70% of cases treated by our department. Neurorrhaphy which includes end-to-end coaptation and *sural* nerve grafting is used in 18% of cases. In the cases treated with neurotization, in 61.5% of the cases it was used *sural* nerve grafting.

Conclusions

Neurosurgical repair of traumatic injury of the peripheral nerves at the Service of Neurosurgery UHC, recognizes all categories of traumatic injury. Computerization for data processing and recording helps greatly in the precision of epidemiological data and constitutes the base that, with the help of data mining, also enables prediction the outcome of the surgeries in new cases.

Future studies to be conducted in this field will focus in determining the level of nerve injury, time from the injury to intervention, distance from the site of trauma to the effector organ. The data will build necessary information for data mining, which based on these important factors that influence the result of nerve repair, will be useful for the prediction of the result in new patients harbouring peripheral nerve injury before undergoing surgery.

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