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INDEX

A PROSPEROUS NEW YEAR FULL OF ACHIEVEMENTS

We conclude the year by presenting our esteemed readers with the final 2024 edition of the CEREM Goiás Scientific Journal. This year has been a great success, as we had the opportunity to significantly contribute to the dissemination of scientific works produced by medical residents and residency programs in our region.

Our expectation is that 2025 will be even more prosperous and productive.

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SCIENTIFIC ARTICLE - ORIGINAL

IMPACT OF MOTORCYCLE ACCIDENTS IN THE MUNICIPALITY OF ANÁPOLIS

DANILO MARQUES LEAL[1]; DANILO TETSUO TAIA MATUSHITA[1]; JOAO VIEIRA DA MOTA NETO

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ABSTRACT

Introduction: Motorcyclists, often involved in serious accidents, represent a significant economic and social burden, especially for low-income families and for social security in cases of death. **Objective:** to carry out a survey of accidents involving motorcycles in the city of Anápolis. **Methods:** This is a descriptive and ecological study that used data from DATASUS. **Results:** Through data collected in DATASUS, it was observed that the number of traumatized motorcyclists in the municipality varied significantly. The year 2021 was its peak, with 504 victims, showing an increase compared to 2020 (308 cases). After this increase, the numbers decreased in 2022 (393) and 2023 (391). The total number of days of hospitalization also followed this trend, reaching 2,107 days in 2021. The value of the Hospital Admission Authorization (AIH) varied, with the lowest value recorded in 2021 (R$1,186.41) and the highest in 2023 (R$1,543 ,33). The total cost of hospital services remained high, with the highest value in 2021 (R$1,186.41). **Conclusion:** Between 2020 and 2023, motorcycle accidents in Anápolis overwhelmed the SUS, hospitalizations and hospital costs totaled R$1,812,540. In the long term, investment in accident prevention can help reduce financial impacts and improve public health in the municipality.

Keywords: Traffic, Injuries, Motorcycles, Prevention.

INTRODUCTION

Traffic injuries represent a public health problem, ranking among the leading causes of death in low- and middle-income countries and as the sixth leading cause of years of life lost due to disability (DALY). In Brazil, in 2020, there were more than 190,000 hospitalizations related to traffic accidents in the Unified Health System (SUS), of which 61.6% involved motorcyclists. Mortality was especially high among young people, being the leading cause of death in the 5 to 14 age group and the second leading cause in the 15 to 39 age group, with 32,716 deaths, 36.7% of which were motorcyclists.[1]

Traffic accidents generate annual costs estimated at R$ 50 billion, primarily due to the loss of productivity of the victims, followed by hospital costs. Motorcyclists, often involved in serious

accidents, represent a significant economic and social burden, especially for low-income families and for social security in cases of death.[1]

Data from the 2019 National Health Survey (PNS) reveal disparities in helmet use: while 82.6% of the population over 18 reported wearing a helmet, this rate varies regionally, being lower in the Northeast (68.6%) and higher in the South (95.7%). Helmet use is also lower among individuals with lower education levels and income. Additionally, 17% of adults reported driving after consuming alcohol, with a higher prevalence among men (20.5%).[1]

TABLE 1 - Risk Factors Related to Motorcycle Injuries

Users	Not wearing a helmet Driving under the influence of alcohol Speeding High acceleration Age/inexperience of users Braking errors Use of drugs (other than alcohol and related substances) Lane switching or zigzag driving Competition Aggressive driving Failure to make oneself visible
Road Environment	Mixed traffic (roads randomly occupied by cars, heavy vehicles such as buses and trucks, pedestrians, cyclists, and motorcyclists) Road infrastructure design Pavement conditions
Vehicles	The inherent lack of protection against trauma. This refers to the nature of the vehicle, which lacks a protective shell and other passive safety devices (side protection bars, airbags).
Structural Factors	Inadequate training (referring to the ease of obtaining a motorcycle license) Deficient legislation Weak enforcement Lenient enforcement policies Unsustainable mobility policies Lack of inclusive urban planning Limited public transport Infrastructure Commercial determinants of health Precarious working conditions

Source: Brasil - Ministério da Saúde.

The use of motorcycles as a means of transportation for work, especially in delivery services, exacerbates the problem, with many accidents being classified as typical work-related accidents.

Motorcycle accidents often result in bone fractures due to the high force involved, which frequently exceeds the bones' capacity to withstand impact. The severity of the fracture depends on the intensity of the force applied and the areas of the body affected. The American Academy of Orthopedic Surgeons classifies fractures into five main types[2]:

Stable fracture: When the ends of the bone are aligned, with no significant displacement.

Open or compound fracture: The skin is broken, though the bone may not be visible in the wound.

Transverse fracture: The fracture occurs along a horizontal line.

Oblique fracture: The fracture follows an angled pattern.

Comminuted fracture: The bone is broken into three or more fragments.

The treatment and long-term prognosis depend on the severity of the fracture and the patient's overall health. Many fractures heal with proper and timely treatment, but some may require more intensive approaches, such as permanent rods or bone grafts[2].

The analysis of the impact of motorcycle accidents in the municipality of Anápolis is of utmost importance for understanding the socioeconomic and public health effects caused by these events. The growing number of motorcyclists in the city, combined with the increasing occurrence of accidents, poses challenges to both the local healthcare system and traffic infrastructure. With a high rate of severe injuries and deaths resulting from motorcycle accidents, it is essential to evaluate the consequences of these accidents for the population's health, hospital costs, and economic implications, such as loss of productivity and increased expenses for medical treatments.

Therefore, the objective of this study is to conduct a survey on motorcycle accidents in the municipality of Anápolis.

METHODS

This is a descriptive and ecological study that used data from the electronic portal of the Department of Informatics of the Unified Health System (DATASUS – http://tabnet.datasus.gov.br).

In Brazil, traffic accident reporting is primarily carried out through the Mortality Information System (SIM) and the Traffic Accident Notification System (SISTAT). These systems are used to register, monitor, and collect data on traffic accidents across the country.

Mortality Information System (SIM): The SIM is maintained by the Ministry of Health and is used to record deaths, including those resulting from traffic accidents. It provides important data on the causes of death, allowing for the analysis of fatal accidents.

Traffic Accident Notification System (SISTAT): SISTAT is a system developed by the National Department of Traffic (DENATRAN) in partnership with the Ministry of Health. Its aim is to register and monitor traffic accidents occurring in the country, including those with victims. The system allows for the collection of detailed information about the circumstances of the accident, the type of injury, and the severity of the victims, in addition to enabling the integration of data from different agencies and levels of government.

These reports are generated through the statistical tabulation application Tabnet, developed

by the Ministry of Health. The data were extracted in November 2014.

Regarding research ethics, the guidelines of the National Health Council Resolution No. 674, dated May 6, 2022, were followed. Since this involves the evaluation of publicly available data, it was not necessary to obtain approval from Plataforma Brasil.

RESULTS

The data were collected from DATASUS in November 2024, covering the years 2020 to 2023, as they are already consolidated data.

Table 1 - Hospital Morbidity in SUS for External Causes - by place of residence - Goiás, Municipality: 520110 ANÁPOLIS, V20-V29 Motorcyclist Trauma, 2020-2023, number of injured individuals.

	2020	2021	2022	2023	Total
ANÁPOLIS	308	504	393	391	1596
Total	308	504	393	391	1596

Table 2 - Hospital Morbidity in SUS for External Causes - by place of residence - Goiás, Municipality: 520110 ANÁPOLIS, V20-V29 Motorcyclist Trauma, 2020-2023, length of stay by Municipality and Year of processing.

	2020	2021	2022	2023	Total
ANÁPOLIS	1720	2107	1605	1584	7016
Total	1720	2107	1605	1584	7016

Table 3 - Hospital Morbidity in SUS for External Causes - by place of residence - Goiás, Municipality: 520110 ANÁPOLIS, V20-V29 Motorcyclist Trauma, 2020-2023, average AIH value by Municipality and Year of processing.

	2020	2021	2022	2023	Total
ANÁPOLIS	1837,51	1186,41	1236,07	1543,33	1411,73
Total	1837,51	1186,41	1236,07	1543,33	1411,73

Table 4 - Hospital Morbidity in SUS for External Causes - by place of residence - Goiás, Municipality: 520110 ANÁPOLIS, V20-V29 Motorcyclist Trauma, 2020-2023, values of hospital services by Municipality and Year of processing.

	2020	2021	2022	2023	Total
ANAPOLIS	463159,3	478210	393041,2	478129,1	1812540
Total	463159,3	478210	393041,2	478129,1	1812540

DISCUSSION

The number of motorcyclists injured in the municipality showed significant variations between 2020 and 2023. In 2021, there was a peak with 504 injured individuals, representing a substantial increase compared to 2020, which had 308 cases. This increase may be related to several factors, such as the growth of the motorcycle fleet or changes in traffic behavior. However, after this peak, the number of injured individuals slightly decreased in 2022 (393) and 2023 (391), although it remains considerably high compared to 2020.

The number of hospital stay days followed the trend of the number of injured individuals, with 2,107 days of hospitalization in 2021, the year with the highest number of victims. The total number of stay days for the period from 2020 to 2023 was 7,016 days, with 2023 showing a slightly lower value (1,584 days) compared to the previous year, 2022 (1,605 days). This indicates that, although the number of injured individuals decreased, the severity of the injuries may have led to longer hospitalizations.

The average value of the Hospital Admission Authorization (AIH) showed significant variations over the years, with the lowest value recorded in 2021 (R$1,186.41) and the highest in 2023 (R$1,543.33). The decrease from 2020 to 2021 may indicate the adoption of cost containment measures or changes in the types of hospitalizations, while the increase in 2023 reflects a possible rise in the cost of hospital services, perhaps due to greater case complexity or inflation in hospital costs.

The total amount spent on hospital services in the municipality increased from 2020 to 2021, from R$463,159.30 to R$478,210, indicating a higher demand for hospital services during that period. This amount remained relatively stable in the following years, with variations in 2022 and 2023 (R$393,041.20 and R$478,129.10, respectively), suggesting that, despite fluctuations in the number of injured individuals, the overall financial impact on the healthcare system remained high.

A study conducted at a government teaching hospital in the municipality of São Paulo analyzed the pattern of injuries in motorcycle accident victims treated at a reference emergency service. The data confirm the predominance of young male victims, with most being discharged

from the hospital. The most frequent injuries were fractures of the limbs and pelvis, superficial wounds, cranioencephalic trauma, and dislocations, with the majority being of mild intensity (ISS between 1 and 9). Among fatal cases, a higher frequency of severe injuries was observed, such as fractures associated with cranioencephalic trauma and damage to abdominal organs.[3]

A study conducted at the Hospital Otávio de Freitas in Recife evaluated traumatic-orthopedic complications in motorcycle accident victims. The research identified that most of the victims were young (18-30 years old), male (95%), with low educational levels (45% had completed elementary school), and the most frequent collisions involved larger vehicles. The reported complications included persistent pain (95%), functional disability (94%), and infections (78%), which often resulted in severe cases such as osteomyelitis and prolonged hospitalizations.[4]

The study conducted at the Evangelical University Hospital of Curitiba (HUEC), Curitiba, PR, Brazil, analyzed the epidemiological profile of limb fractures in motorcycle accident victims treated at the emergency department between 2007 and 2013. This is a retrospective, descriptive, and observational study, analyzing 3,528 victims, of which 88.29% were men and 11.71% were women, with an average age of 29.7 years. A total of 4,365 fractures were identified, with a predominance in the lower limbs (59.66%) compared to the upper limbs (40.34%). The most common fractures were of the leg (18.14%), followed by the hand (11.57%) and wrist (10.65%).[5]

Another study conducted at the General Hospital of the State of Bahia between 2000 and 2010 analyzed the incidence of spinal cord injuries associated with motorcycle accidents, correlating them with the increase in motorcycle sales during the period and the anatomical distribution of the injuries. A total of 110 patient records with traumatic spinal injuries were evaluated, with an average age of 30 years, predominantly young individuals. A nearly fivefold increase in the incidence of injuries was observed, following the growth in motorcycle use in Brazil. The injuries were most frequent in the cervical spine (51.4%), followed by the thoracic spine (37.2%) and lumbar spine (11.4%). Only 34.3% of patients had no neurological deficit upon admission, with more severe and frequent spinal cord injuries associated with thoracic fractures.[6]

When analyzing motorcycle accidents as one of the leading causes of death and disability among the young population in Mexico, a descriptive and cross-sectional study included 98 patients who required orthopedic surgical treatment, with a predominance of men (94%) and an average age of 29.7 years. The results revealed that the most frequent accidents involved male motorcyclists with motorcycles under 150 cm^3, occurring mainly in rural areas and without helmet use (75.5%), usually involving a collision with a moving object. The most common fractures were of the tibia and fibula (28.9%), open fractures (52.3%), femur (25%), and forearm (10.5%). According to the AO classification, the most common fractures were AO 42 B 3.3, AO 32A3.2, and AO 23B1.2, which correspond to cases with a worse prognosis.[7]

The financial impact of motorcycle injuries in traffic is significant, placing increasing pressure on the resources of the Unified Health System (SUS) and affiliated hospitals. Although the number of deaths remained stable between 2011 (11,485 deaths) and 2021

(11,115 deaths), the hospitalization rate increased considerably, with a 55% growth over the period. In 2011, the hospitalization rate for motorcyclists was 3.9 per 10,000 inhabitants, rising to 6.1 in 2021, resulting in a cost of R$ 167 million in that year alone. This increase is directly related to the high frequency of severe injuries that require prolonged and complex treatments, overloading the healthcare system and generating high financial costs. In 2020, Brazil recorded more than 190,000 hospitalizations due to traffic injuries, of which over 61% involved motorcyclists, making it a public health issue with substantial financial implications. These injuries are responsible for a large portion of hospital costs and lost workdays, as well as directly impacting the country's economy.[1]

CONCLUSIONS

This analysis demonstrated the impact of motorcycle accidents in the municipality of Anápolis, particularly regarding the increase in hospitalizations and the consequent overload of the Unified Health System (SUS). Between 2020 and 2023, a considerable variation in the number of traumatized motorcyclists was observed, with a peak in 2021 that required a high amount of hospital resources. Although the number of injured individuals decreased in 2022 and 2023, the severity of the injuries resulted in prolonged hospitalizations, which increased the costs of hospital treatments.

The financial data indicate that the impact of injuries related to motorcycle accidents is substantial, with a significant increase in hospital expenses, reaching a total of R$1,812,540.00 between 2020 and 2023. The average value of the Hospital Admission Authorization (AIH) varied over the years, reflecting both changes in hospital costs and the complexity of hospitalizations. The severity of the injuries, combined with the increase in the motorcycle fleet and the lack of preventive measures, results in high costs for both the municipal and state healthcare systems.

This scenario highlights the need for public policies focused on preventing motorcycle accidents, such as awareness campaigns about the use of protective equipment, as well as improvements in road infrastructure. These actions would not only contribute to reducing the number of victims but also decrease the significant financial impact that motorcycle accidents impose on the healthcare system, alleviating the pressure on hospitals and public resources. In the long term, investing in accident prevention could result in considerable savings and contribute to the improvement of public health in the municipality of Anápolis.

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INVESTIGATION OF THE PREVALENCE OF DELIRIUM, PAIN, MOBILIZATION INDICES, FRAILTY, AND MUSCLE WEAKNESS IN PATIENTS ADMITTED TO WARDS

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ABSTRACT

Introduction: Patients admitted to wards are subject to complicated situations such as the emergence of delirium, the presence of pain and the development of muscle weakness or frailty. Low mobilization rates are also associated with adverse events, increasing morbidity and mortality in this population. Aims: 1) Investigate the prevalence of delirium, pain, frailty and muscle weakness in patients admitted to wards. 2) Characterize the mobilization pattern adopted with patients. **Methods:** Cohort study that followed patients admitted to the clinical and surgical wards of Hospital e Maternidade São Cristóvão (HMSC) who were monitored during their hospitalization, in 03 assessments (beginning, intermediate and end of hospitalization). Delirium was assessed using the 3D-CAM questionnaire. Pain was investigated using a pain body map and the pain visual analogue scale (VAS). Frailty was studied using the CFS scale (Clinical Frailty Scale). Weakness was investigated using the MRC scale (Medical Research Council) and the handgrip dynamometer (Saehan®). Finally, the mobilization indices adopted with the patients were measured using the JHMS (Johns Hopkins Mobility Scale). Data were presented as mean and standard deviation and absolute and relative frequency. The student's t test and the chi-square test were used, when necessary, assuming values of $p \leq 0.05$ as significant. **Results:** 62 patients were studied (age: 79.8±0.4 years; BMI: 26.4±6.3 kg/m2; 37.5% male). The total hospitalization days were 12.3±8.8 days, with 23.4% of the sample passing through the intensive care unit (ICU), remaining there for 5.9±5.8 days, before being admitted to the infirmary. The main cause of hospital admission was related to the respiratory system (32.9%), followed by the cardiovascular system (21.1%). The delirium observed in the sample was 27.0%, with the hypoactive type being the most prevalent (70.6% of cases). When considering the number of medications used at home versus the number of medications during hospitalization, there was a significant increase in their quantity (home: 4.8±2.8 vs. Hospitalization: 10.8±4.2 medications, p: 0.00), which may be associated with the emergence of delirium. Pain was present in 22.9% of assessments, with an average intensity of 1.1±5.9 points on the VAS. The area most frequently referred to as painful by patients was the lower limbs (47.1%), followed by the abdomen (15.7%). Measured by the CFS, the presence of some degree of fragility/vulnerability in the sample was 54.7%. In the assessment of strength by MRC, 14.5% of patients presented

weakness. Using handgrip dynamometry, 25.1% had weakness and 40.1% had severe weakness. To verify mobilization rates based on JHMS, it was shown that 61.5% of the sample remained in bed throughout their hospitalization and only 7.4% of patients walked, at some point, more than 76 meters during their hospitalization. Mortality in the sample was 7.8%. **Conclusions:** 1) Important portions of the studied population presented complications and adverse events during their hospitalization. Representative rates of delirium, pain, frailty/vulnerability and weakness were observed. 2) A large portion of the patients evaluated remained in bed during their hospitalization, which could further worsen the emergence of the findings presented here. Implementing assessment tools, systematizing the processes involved and implementing measures that can minimize such situations is fundamental to improving the hospital care provided at HMSC.

Keywords: Delirium, Elderly, Cognitive Dysfunction, Mobilization.

INTRODUCTION

Delirium is understood as an acute alteration of mental status, characterized by a wide range of neuropsychiatric signs and symptoms, with a fluctuating course, and explained by disruptions in cerebral homeostasis.[1],[2],[3]

This condition is common among hospitalized elderly patients. One-third of general medical patients aged 70 or older experience delirium, with the condition being present in half of these patients upon admission. In contrast, the prevalence among patients admitted to intensive care units (ICUs) who have undergone mechanical ventilation can exceed 75%.[1]

In the study by Park and Kim (2019)[3], in-hospital mortality, as well as mortality at 3, 6, and 12 months, was significantly higher in patients with delirium. These patients also had higher rates of adverse events, hospital expenses, and hospital readmissions.

There are three classifications of delirium. Hyperactive delirium is characterized by restlessness, agitation, and emotional lability. Hypoactive delirium is defined by the presence of apathy and reduced responsiveness. In the mixed type, there is an alternation between hypoactive and hyperactive characteristics.[4] Delirium has several risk factors, including preexisting cognitive impairment, advanced age, use of psychoactive drugs, mechanical ventilation, untreated pain, and a variety of medical conditions such as heart failure, prolonged immobilization, abnormal blood pressure, anemia, sleep deprivation, and sepsis.[5]

Considering the above, the objective of this study was to investigate the prevalence of delirium, pain, frailty, and muscle weakness in patients admitted to the wards and to characterize the mobilization patterns adopted.

METHODOLOGY

This is an analytical cohort study. The research began after approval by the Research Ethics Committee of Hospital e Maternidade São Cristóvão (HMSC) in São Paulo/SP.

Patients aged 60 years or older, of both sexes, admitted to Hospital e Maternidade São Cristóvão and hospitalized in the wards between July and September 2024 were evaluated. Patients with a history of alcoholism and those with previous neurological diagnoses were excluded from the study.

A screening of the patients at the research site was conducted through the electronic medical records system. Then, eligible patients were invited to participate in the study, and their companions were asked to read and sign the informed consent form (ICF or TCLE

in Brazilian Portuguese).

The main patient data were collected from their medical records, such as diagnosis, hospital length of stay, and medications in use during hospitalization. Additionally, a bedside interview was conducted, gathering vital signs, home medications, comorbidities, lifestyle habits, present invasive devices, and the presence of physical restraints.

During the evaluations, the 3-Minute Diagnostic Interview for Confusion Assessment Method (3D-CAM) scale was used to diagnose delirium in patients. The Medical Research Council (MRC) scale was applied to assess the presence of weakness, and grip strength was measured using the Saehan® hand dynamometer. Additionally, patients were questioned about the presence of pain, which was graded using the visual analog scale and a pain map. To characterize in-hospital mobility, the Johns-Hopkins Maximum Mobility Scale (JHMS) was used daily for the patients included in the study. Functionality and frailty were assessed using the Clinical Frailty Scale (CFS).

A minimum of three assessments were conducted for each patient: initial, intermediate, and final. The initial assessment was performed within 48 hours of the patient's admission to the ward, followed by the intermediate assessment after 4 days. Finally, the final assessment was conducted on the day of the patient's discharge.

The data were presented as means with standard deviation, as well as absolute and relative frequencies. The Student's t-test and Chi-square test were used when necessary, with p values ≤ 0.05 considered statistically significant.

RESULTS

The sample consisted of 62 patients, with an average age of 79.8±0.4 years, as presented in Table 1. The total length of hospital stay was 12.3±8.8 days, with 23.4% of the sample having been admitted to the Intensive Care Unit (ICU), where they remained for 5.9±5.8 days before being transferred to the ward.

The main causes of hospital admission were related to the respiratory system (32.9%), followed by the cardiovascular system (21.1%) and orthopedic system (19.7%).

Delirium was observed in 27.0% of the sample, with the hypoactive type being the most prevalent, accounting for 70.6% of the cases (n=12). The hyperactive and mixed types had prevalences of 17.6% (n=3) and 11.8% (n=2), respectively.

Table 01. Baseline characteristics of the sample

Variable	N (%)	Total
Sex (M/F)	22 (35.5)/ 40 (64.5)	62 (100.0%)
Age (years)*	79.8±9.4	
Weight (Kg)*	69.5±16.7	
Height (meters)*	1.62±0.08	
BMI (Kg/m^2)*	26.4±6.3	

Legend: N: number; %: percentage; M: male; F: female; Kg: kilograms; *: mean ± standard deviation.

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No total 3 pacientes estavam com contenção mecânica no momento da avaliação, sendo que todos estes apresentaram delirium.

The number of medications used at home versus the number of medications during hospitalization showed a significant increase in the quantity (home: 4.8±2.8 vs. hospitalization: 10.8±4.2 medications, p: 0.00).

Regarding the presence of comorbidities, patients had an average of 2.3±1.4 coexisting conditions. Hypertension was the most prevalent, affecting 29.6% of the patients.

Pain was present in 22.9% of the assessments, with an average intensity of 1.1±5.9 points on the Visual Analog Scale (VAS). The most commonly reported painful area by patients was the lower limbs (47.1%), followed by the abdomen (15.7%) and upper limbs (13.7%).

In the strength assessment using the MRC scale, 14.5% of patients exhibited weakness. Through grip dynamometry, 25.1% showed weakness, and 40.1% exhibited severe weakness.

To assess the mobilization indices based on the JHMS, it was found that 61.5% of the sample remained in bed during the assessments, and in only 7.4% of the assessments did patients walk more than 76 meters. Table 02 presents comparative values between patients with and without delirium, considering their mobility, showing that patients who remained in bed (JHMS 1 and 2) had a higher prevalence of delirium.

Table 02. Baseline characteristics of the sample

Variable	JH 1 and 2 - in bed N (%)	JH 3 and 8 – out of bed N (%)	Total
Delirium	161 (68.8%)	73 (31.2%)	234 (100.0%)
Without *delirium*	309 (58.3%)*	221 (41.7%)*	530 (100.0%)
Total number of bedside assessments	460	294	754

Legend: N: number; %: percentage; *p:0.03 comparing bed stay between the Delirium and non-Delirium groups using the Chi-Square test.

Measured by the CFS, the presence of some degree of frailty/vulnerability in the sample was 54.7%.

The mortality rate in the sample during the research was 7.8%.

DISCUSSION

In our research, the most prevalent type of delirium was the hypoactive type (17%), characterized by less responsive behavior and difficult detection. In Todd's systematic review[6], it was shown that less interactive patients at hospital admission had a higher mortality rate; this reduction in interaction is strongly correlated with the presence of hypoactive delirium. In light of this, the implementation of tools that assist in the early detection of hypoactive delirium, combined with treatment protocols, may lead to better outcomes for these patients. In our sub-analysis, we demonstrated that patients who experienced delirium got out of bed less during assessments. This finding aligns with data from Zoremba and Coburn[7], who also showed that staying in bed is associated with more complications, such as delirium.

Delirium, in addition to being associated with increased morbidity and mortality, costs, complications, and delays in physical and cognitive recovery, also contributes to longer hospital stays. This, combined with immobility and the inflammatory process of the condition, exacerbates the reduction of muscle strength and mass, leading to the development of sarcopenia and, consequently, frailty.[8,9] Both conditions are linked to an increased risk of adverse health outcomes and functional loss, worsening the patient's quality of life.[10] In our sample, a large portion of the patients already had reduced muscle strength during the first assessment, as well as high levels of frailty. These factors are potentially worsened by the low mobilization rates observed during the study. Early mobilization, when done correctly, mitigates muscle strength loss and has the potential to reduce hospital stay duration, leading to favorable outcomes for this population.[11] It can also reduce the rate of delirium and significantly increase the likelihood of returning to independent living.[8]

Pain and its intensity are considered a modifiable risk factor for the development of delirium.[12] The pain reported by patients using the Visual Analog Scale (VAS) was present in 22.9% of the evaluations, with significant variability in intensity, as evidenced by the high standard deviation (±5.9 points on the VAS). The presence of pain is associated with the use of analgesic medications, including opioids and benzodiazepines, which also promote the development of delirium. A large portion of the studied sample experienced polypharmacy, as the average use of medications during hospitalization doubled compared to the use at home (home: 4.8±2.8 vs. hospitalization: 10.8±4.2 medications). This contributes to the occurrence of delirium, particularly when combined with the use of psychotropic medications.[12,13]

CONCLUSION

Important segments of the studied population experienced complications and adverse events during their hospitalization. Representatively high rates of delirium, pain, fragility/vulnerability, and weakness were observed. A large portion of the evaluated patients remained in bed throughout their hospitalization, which may exacerbate the emergence of the findings presented here. Implementing assessment tools, systematizing the processes involved, and implementing measures to minimize such conditions are essential for improving the hospital care provided at HMSC.

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SCIENTIFIC ARTICLE - CASE REPORT

GENERAL ANESTHESIA FOR PACEMAKER IMPLANTATION IN A PATIENT WITH AMIOTROPHIC LATERAL SCLEROSIS: CASE REPORT

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ABSTRACT
Amyotrophic lateral sclerosis (ALS) is the most common form of upper and lower motor neuron disease. Due to rapidly progressive neurodegeneration, surgical interventions are necessary to improve and prolong the life of patients. With the advancement of therapeutic options, anesthesiologists have increased contact with ALS patients, and it is essential to master the pre, intra and postoperative management of this population, which requires special anesthetic care. The objective of this article is to describe the case report of a patient with ALS who underwent total intravenous general anesthesia for surgical implantation of a multisite pacemaker.

Keywords: Amyotrophic lateral sclerosis, Artificial Pacemaker, General anesthesia.

INTRODUCTION

Amyotrophic Lateral Sclerosis (ALS) or Lou Gehrig's Disease is a relatively rare, fatal, rapidly progressing neurodegenerative disease that affects 1-2.6 per 100,000 people annually. Its incidence increases with age, peaking between 60 and 79 years. ALS is the most common form of upper and lower motor neuron disease. Ninety percent of ALS cases are sporadic, while 10% are familial. Clinical manifestations include muscle weakness and atrophy, lack of coordination, spasticity, hyperreflexia, Babinski sign, fasciculations, and cramps. Motor impairment and functional deterioration are measured using the Revised ALS Functional Rating Scale (ALSFRS-R), a tool for assessing the functionality and disease-specific severity. The scale evaluates 12 items (Speech, Salivation, Swallowing, Handwriting, Cutting Food, Dressing and Hygiene, Transfers, Walking, Climbing Stairs, Dyspnea, Orthopnea, and Respiratory Insufficiency), with a score of zero to four for each item, and a total score ranging from 0 to 48 points, where 48 indicates normal functionality and 0 indicates complete disability. The treatment is palliative and includes symptomatic relief and supportive care. As the disease progresses, surgical interventions may be necessary to improve and prolong the lives of patients. With advances in therapeutic options,

the anesthesiologist's contact with ALS patients has increased. Pre-, intra-, and postoperative management of this population requires special care, as they are more susceptible to anesthesia-associated complications.[1-6]

CASE REPORT

Male patient, 67 years old, 70 kg, with recently diagnosed ALS (less than a year ago). The patient is on home oxygen therapy (nasal cannula oxygen support). Admitted to the Surgical Center on room air, presenting with hypoxemia (70%), which improved after oxygen administration with an oxygen mask. The patient had no motor deficits, and no impairments in speech, gait, or swallowing. An echocardiogram showed moderate dilation of the left heart chambers, left ventricle with moderate to severe global diastolic dysfunction, and moderate diastolic dysfunction. The mitral and tricuspid valves were structurally normal with mild insufficiency, and mild to moderate pulmonary hypertension (pulmonary artery pressure of 50 mmHg). A Holter exam revealed a sinus rhythm with atrial flutter, ventricular arrhythmias, polymorphic extrasystoles, ventricular bigeminy, runs of ventricular extrasystoles, and non-sustained ventricular tachycardia. A chest CT scan showed signs of interstitial edema, changes in the left lower lobe suggestive of bronchopneumonia and inflammatory bronchopathy, small right-sided pleural effusion and laminar effusion on the left side, with adjacent atelectasis, and an enlarged heart.

Surgical proposal for multi-site pacemaker implantation and anesthetic planning for total intravenous general anesthesia. Monitoring included cardioscope, pulse oximeter, temperature, invasive blood pressure in the right radial artery, capnography, Conox, TOF (Train-of-four), and urine output. Pre-oxygenation was performed using a facial oxygen mask. Anesthetic induction was carried out with Sufentanil 15 mcg, Propofol TCI (target-controlled infusion), Rocuronium 50 mg, and Dobutamine 0.15 mg/kg/h. Periglottic block with Ropivacaine 1% 5 ml was performed. Orotracheal intubation was performed using direct laryngoscopy with an 8.0 tube. Intravenous anesthetic maintenance was achieved with Remifentanil 0.15 mcg/kg/min and Propofol TCI. The patient remained hemodynamically stable, with Dobutamine 0.15 mg/kg/h throughout the procedure. No additional doses of neuromuscular blockers were required after anesthetic induction. For symptomatic control and prophylaxis, the following were administered: Dipyrone 2 g, Ondansetron 8 mg, Lidocaine 80 mg, Omeprazole 40 mg, Dexamethasone 10 mg, and Cephalothin 2 g. The procedure was completed without complications, lasting approximately three hours. The patient was extubated in the operating room after the administration of Sugammadex 200 mg, guided by TOF, with total reversal of the neuromuscular block. The patient was transferred to the ICU, hemodynamically stable, without the use of any drugs. The patient was discharged.

DISCUSSION

ALS manifests through a combination of upper and lower motor neuron dysfunction, affecting the bulbar, cervical, thoracic, and lumbar segments. The complete molecular basis of its pathophysiology is not yet fully understood. Pathophysiological processes are divided into four main categories: impaired RNA metabolism, altered autophagy, cytoskeletal defects, and mitochondrial dysfunction. It is believed that there are three variants of ALS: the classic

sporadic type, familial ALS, and the Western Pacific type, which is often associated with dementia. Approximately 10% of ALS cases are familial and caused by genetic mutations, typically inherited in an autosomal dominant Mendelian pattern. Besides the genetic component, environmental exposure appears to influence disease susceptibility. Suspected associated risk factors include smoking, athletic predisposition or activity, military service, β-N-methylamino-L-alanine, head trauma, electromagnetic fields, agricultural chemicals, and exposure to lead and other heavy metals.[1, 4]

The pattern of neurodegeneration follows a heterogeneous course, progressively affecting an increasing number of muscle groups until the condition presents a symmetrical distribution. Initially, there is progressive weakness of the voluntary skeletal muscles involved in limb movement, evolving asymmetrically and spreading contralaterally, rostrally, and caudally, most often in an anatomically contiguous manner. The disease then progresses to the bulbar muscles, leading to impaired swallowing (dysphagia) and speech (dysarthria). Involvement of the respiratory muscles results in respiratory insufficiency with hypercapnia, an inability to clear secretions, which in turn increases the risk of aspiration and respiratory disorders. This constitutes the main cause of death in ALS, which occurs on average two to three years after the onset of symptoms. Sphincter and extraocular muscles are usually spared.[3,7]

Despite the predominance of motor dysfunction in the manifestations of the disease, cognitive and behavioral changes can occur early in the disease course in 35% to 50% of cases. Individuals with ALS may present with language and executive function impairments, apathy, compulsive behavior, loss of empathy, irritability, disregard for hygiene, changes in eating habits, emotional lability, depression, anxiety, and sleep disturbances.[3]

Given the progressive nature of the disease and advances in palliative treatments to ensure the quality of life for patients, surgical procedures have increasingly been performed in this population, such as percutaneous enteral gastrostomy, long-term catheter insertion, and tracheostomy. Consequently, the anesthetic management of this group of patients, which requires special care, has increased.[8]

Anesthetic techniques, whether regional or general, pose different risks for patients with ALS. Risks include gastric aspiration, postoperative ventilatory support, autonomic instability, and increased and unpredictable sensitivity to opioids, sedatives/hypnotics, and non-depolarizing neuromuscular blocking agents. The anesthetist should begin care for the ALS patient in the preoperative phase. It is important to conduct pulmonary function tests to assess the possibility of respiratory complications. The forced vital capacity (FVC) is a parameter used to evaluate the success of extubation: if < 50%, patients should receive non-invasive positive pressure ventilation. Advanced bulbar symptoms increase the risk of aspiration and respiratory inadequacy.[2, 4]

In the intraoperative phase, fast-acting and reversible analgesic and amnesic agents should be used. The infusion of remifentanil and propofol for induction is an alternative used due to its ultrashort action. Regarding inhalational anesthetics, attention should be paid to the potential for respiratory depression in the postoperative period. Sevoflurane has low lipid solubility, making it suitable for its rapid reversal, as does desflurane. Desflurane is the least soluble of the inhalational anesthetics, ensuring the early recovery of airway functions. Additionally, when used above a minimal alveolar concentration, it

promotes muscle relaxation in a dose-dependent manner.[2, 7]

Neuromuscular blockers should be used in low doses for patients with ALS. Depolarizing neuromuscular blockers should be avoided due to the potential risk of hyperkalemia. Non-depolarizing blockers act as competitive antagonists of the postsynaptic receptor, preventing acetylcholine from binding to its receptor, leading to flaccid paralysis and prolonged weakness. The reversal of the blockade with Sugamadex at a dose of 2 mg/kg accelerates the reversal of paralysis.[4]

In the postoperative period, monitoring the respiratory pattern is crucial, as this group of patients has impaired respiratory function and limited functional reserve, along with an inability to clear secretions and chronic carbon dioxide retention. Non-invasive ventilatory devices can be helpful in ensuring the success of extubation. Additionally, changes in the level of consciousness and mental confusion may indicate hypercarbia. Supplemental oxygen therapy should also be limited, as respiratory drive and control are dependent on oxygen saturation during sleep.[4]

Local and regional anesthetic techniques, such as peripheral nerve blocks, have increasingly been indicated for patients with ALS, with fewer complications reported compared to general anesthesia. These techniques can be utilized both intraoperatively and for postoperative pain management. Traditionally, they were avoided due to concerns about worsening pre-existing neurological symptoms, justified by the "double crush" theory. This theory posits that a nerve with a prior compressive injury is more likely to be injured again, suggesting that patients with motor neuron diseases like ALS, who already have neurological disturbances as the "first crush" could experience a "second crush" when subjected to mechanical, ischemic, or toxic insults associated with regional anesthesia. However, reported worsening of neurological symptoms has been associated with factors such as surgical stress, positioning, body habitus, and local anesthetic concentration. There has been an increase in case reports documenting successful use of regional anesthetic techniques without exacerbation of neurological symptoms, as seen in this case report.[2, 4]

In summary, the anesthetic management of patients with ALS should begin with pre-anesthetic care, assessing the functional impairment of the disease and its systemic repercussions to tailor the approach. Motor impairment and functional deterioration, measured by the ALSFRS-R, are critical for evaluating the disease's severity, which was not conducted in the current case report. Nonetheless, intraoperative care with monitoring using a cardiograph, pulse oximeter, temperature, invasive blood pressure in the right radial artery, capnography, Conox, TOF, and diuresis was essential for guided and successful anesthetic management. The choice of short-acting medications like Propofol and Remifentanil for maintenance anesthesia also aligns with recommendations found in the literature. The success of extubation was ensured by using Rocuronium in low doses, with monitoring of neuromuscular function via TOF guiding reversal with Sugammadex. Postoperative care in the ICU for ventilatory support was also crucial for the case's outcome.

CONCLUSION

The anesthesiologist must pay close attention to the specific characteristics of patients with ALS, conducting a thorough evaluation starting from the preoperative phase. The adoption of appropriate medications and adequate support during the anesthetic procedure and postoperative care can ensure, as demonstrated in this case, that the surgery proceeds without

complications, allowing the individual to be extubated in a short time without compromising their motor and cognitive functions.

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ANGINA PECTORIS ASSOCIATED WITH CORONARY-SUBCLAVIAN STEAL SYNDROME: CASE REPORT

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ABSTRACT

Introduction: Coronary-subclavian steal syndrome (CSSS) is a rare cause of myocardial ischemia after myocardial revascularization surgery (0.1% to 6%), with the main etiology being atherosclerosis. CSSS has an incidence of 3% in the population with atherosclerotic disease. The existence of peripheral vascular disease is the best predictive factor for the occurrence of CSSS. Prevalence is difficult to determine as many patients do not experience symptoms due to the development of an additional collateral network. Treatment is centered on correcting subclavian artery stenosis. Over the last decades, endovascular revascularization of subclavian arteries has presented excellent technical success rates (97%) and patency (5-year patency rate of 89–95%), comparable to surgical revascularization, with the advantage of being a minimally invasive technique, with morbidity and mortality rates (4.5%) lower than surgery and associated with shorter hospitalization, as well as faster recovery. We report a case of angina pectoris, in a post-CABG patient, with SRCS as the etiology and how the diagnosis and management of the case were made.

Keywords: Angina pectoris, Myocardial Revascularization, Subclavian Artery.

INTRODUCTION

The coronary-subclavian steal syndrome (CSSS) was first described in 1974 by Harjola and Valle. In patients undergoing coronary artery bypass grafting (CABG) using internal mammary arteries (IMA) as conduits, the presence of stenosis in the subclavian arteries proximal to the origin of the IMA causes a decrease in blood flow to the upper limb, leading to the reversal of flow in the IMA, with concomitant hemodynamic "steal" from the coronary circulation to the upper limb.[1]

According to Vieira et al.[2], CSSS is a rare cause of myocardial ischemia after CABG (0.1% to

6%), with atherosclerosis being the main etiology. Cases have also been described in patients with Takayasu arteritis or left internal mammary artery malformations, such as arteriovenous fistulas. CSSS has an incidence of 3% in the population with atherosclerotic disease. The presence of peripheral vascular disease is the best predictive factor for the occurrence of CSSS. The prevalence is difficult to determine, as many patients are asymptomatic due to the development of a collateral network.[3] The syndrome usually emerges between two and 31 years after CABG (mean age of 14 years), indicating that occlusive lesions developed after the mammary graft, with the onset of CSSS within one year after CABG suggesting that the stenosis of the left subclavian artery (LSA) was not detected at the time of cardiac surgery.[4]

Patients may be asymptomatic; however, the diagnosis should be considered in those undergoing CABG using the left internal mammary artery (LIMA) who present with cardiac symptoms such as angina-like chest pain and episodes of arrhythmia, as well as non-cardiac symptoms such as dizziness, vertigo, ataxia, and upper limb claudication. The condition is usually triggered or exacerbated by physical exertion. The physical examination should look for supraclavicular murmurs, pulse asymmetry, and, most importantly, a difference in blood pressure (BP) between the upper limbs >20 mmHg, with the latter being the most significant finding. Color Doppler ultrasound is a valid test for detecting hemodynamically significant stenosis in the subclavian territory, and images from computed tomography angiography (CTA) and magnetic resonance angiography (MRA) can also be considered for this purpose. However, digital subtraction angiography remains the gold standard for diagnosis. In this method, after contrast injection into the left anterior descending artery, the reverse flow of the LIMA toward the subclavian bed can be observed.[4]

The treatment is centered on correcting the subclavian artery stenosis. Previously, the recommended treatment was surgical and involved reimplanting the internal mammary artery (IMA) into the aorta to ensure graft patency and treat the subclavian stenosis, through carotid-subclavian grafting, aorto-subclavian grafting, or subclavian-carotid transposition. Although these procedures have high success rates and good long-term results, surgery is labor-intensive and subject to complications. Endovascular revascularization of the subclavian arteries has shown excellent technical success rates (97%) and patency rates (5-year patency rate of 89-95%) over the past decades, comparable to those of surgical revascularization. The advantage of endovascular treatment is that it is minimally invasive, with lower morbidity and mortality rates (4.5%) compared to surgery, as well as shorter hospital stays and faster recovery.[1]

Our objective with this case report is to raise awareness of the possibility of this disease in patients undergoing CABG with episodes of angina, given its rarity and low prevalence.

CASE REPORT

An 85-year-old male patient presented to the emergency department (ED) four days before the consultation with a recent onset of edema in the lower limbs (LL) associated with episodes of precordial burning chest pain of mild intensity, occurring at rest and with upper limb mobilization, lasting less than five minutes and resolving spontaneously, starting earlier that week. He reports having had episodes of blood pressure differences in the upper limbs for the past two months. No pain was present at the time of the consultation. On examination, the patient appeared in good general condition, with a normal complexion and

hydration status. Blood pressure in the right upper limb (RUL) was 180/100 mmHg, and in the left upper limb (LUL) was 150/85 mmHg. Cardiac auscultation: regular rhythm, no murmurs, normal heart sounds, presence of a murmur ++/6 at the right subclavian site, edema in the lower limbs (LL) ++/4+.

The patient has a medical history of CABG in 2005 (left mammary artery to marginal branch 2, right mammary artery to left anterior descending artery), hypothyroidism, systemic arterial hypertension, mixed dyslipidemia, non-specific interstitial pneumonia, and is a former smoker. No known drug allergies. He is on continuous use of Syntroid® 150mcg, Livalo® 4mg, Ezetimibe 10mg, Concor® 5mg, Benicar anlo® 20/5mg, Clopidogrel 75mg, Dexilant® 30mg, Addera® 10,000, and Lipless® 100mg.

The patient underwent complementary exams in the emergency department: Chest X-ray showed bilateral opacities with an interstitial component. Electrocardiogram revealed sinus rhythm, within normal limits. Laboratory results showed BNP 99 pg/ml; Troponin 7.5 and 7.4 ng/ml. An angioCT (Figure 1) of the aorta and central vessels was requested during the consultation, which demonstrated: no aneurysm, dissection, mural hematoma, or ulceration. A predominantly calcified plaque was observed in the proximal portion of the right subclavian artery, extending approximately 0.8 cm, causing severe stenosis and occupying nearly the entire lumen in this area. In the other segments assessed, the subclavian arteries showed signs of mild atheromatosis without hemodynamically significant stenosis, including along the thoracic outlet bilaterally.

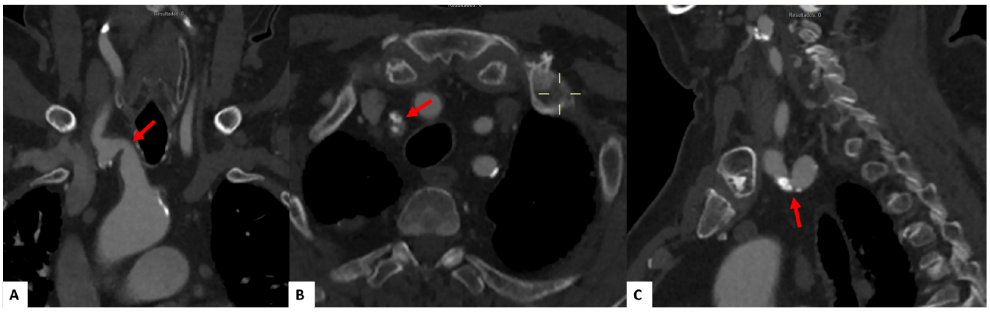

Figure 1: Angiotomography. The red arrow indicates stenosis in the right subclavian artery near the bifurcation of the brachiocephalic trunk.

After discussion with the radiologist and vascular surgeon, it was decided to perform a catheterization for better evaluation of the coronary grafts. The findings were as follows: the right coronary artery showed 50% stenosis at the mid-proximal transition and 30% stenosis in the distal third. The trunk had 50% stenosis in the distal third. The left anterior descending artery (LAD) had ostial occlusion. The right mammary artery to LAD graft was patent and functioning with a good anastomosis. The circumflex artery had a 90% calcified stenosis at its origin. The left mammary artery to marginal branch 2 graft was patent and functioning with a good anastomosis. The access route showed diffuse atherosclerosis and significant stenosis along the path, identifying a subocclusive stenosis of the right subclavian artery.

After review of the exam, it was decided to proceed with angioplasty in the stenotic region, using a right brachial artery puncture after dissection. A 12x40mm stent was implanted with significant technical difficulty due to tortuosity, but it was successfully placed in the proper position after using a centimeter-sized pigtail catheter to assess diameters. However, the stent migrated proximally due to the force of the stenosis, without distal embolization. A new puncture was necessary through the right femoral artery, where the guidewire was advanced, and a new 10x40mm stent was implanted in the correct position using the "wire mesh" technique, followed by balloon dilatation with a 7x40mm balloon catheter. Control angiography showed correction of the stenosis and proper stent placement, with no signs of dissection or embolization (Figure 2).

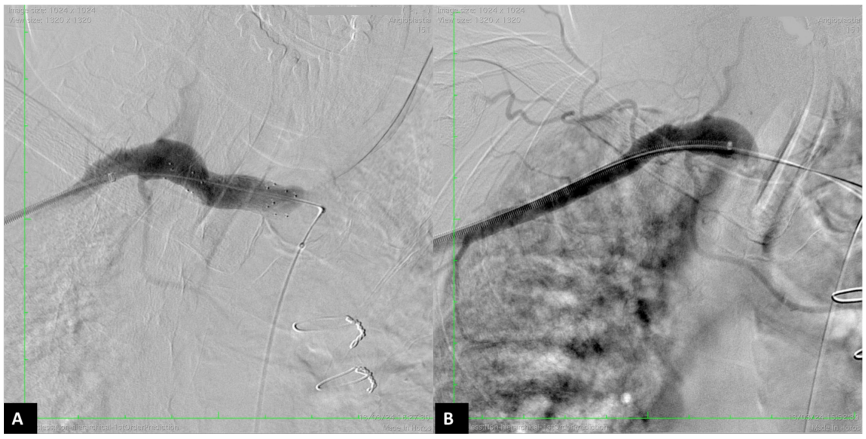

Figure 2: Angiograms. A: Pre-angioplasty image showing subclavian stenosis. B: Post-angioplasty image showing stenosis with stent.

DISCUSSION

SCVS is defined as the reversed blood flow from a coronary artery through an internal mammary artery graft toward the mid-distal subclavian artery, and occurs due to significant stenosis or total occlusion of the proximal portion of the latter. It is a rare, yet significant, cause of cardiac ischemia after coronary artery bypass surgery.[4] This report discusses the most commonly used treatment for this complication today: percutaneous transluminal angioplasty to correct the affected subclavian stenosis.

Since the 1990s, percutaneous transluminal angioplasty has been considered the effective treatment for subclavian artery stenosis (SAS). The technique, followed by stent implantation, provides more anatomical and physiological results when compared to open surgery, and is associated with low morbidity, zero mortality, and short hospital stays. The short-term technical success rate is >90%, and long-term follow-up shows patency rates greater than 90% at five years.[4] One of the largest studies, including 170 patients who underwent stent placement in subclavian or innominate arteries, reported a technical success rate of 98.3%, with 99.4% for stenotic lesions and 90.5% for occlusions. There were no procedure-related

deaths, and a stroke occurred in 0.6% of cases. In long-term follow-up, 82% of all treated patients remained asymptomatic, with a primary patency of 83% and secondary patency of 96%.[5]

The "clothesline" technique used for the correction of aortic aneurysms involves passing a guidewire from the femoral artery to the brachial artery and then pulling its ends, straightening the artery through a stretching mechanism. This allows for better passage of the delivery system for the endoprosthesis and facilitates the subsequent placement of the stent.[6] This technique was employed in the procedure in question due to anatomical difficulty and the unsuccessful implantation of the first stent using the conventional technique.

The occurrence of restenosis after endovascular procedures is relatively low, around 16% at 5 years, and can be treated with repeat procedures. Thus, endovascular revascularization is now used as the first-line technique for treating SRCS. Surgical revascularization remains an important technique, used when it is not possible to bypass the lesion during angioplasty, in calcified occlusive lesions, in long obstructive lesions, and in certain cases of restenosis.[1]

In conclusion, we would like to consolidate the diagnostic hypothesis of subclavian-coronary steal syndrome as a differential diagnosis for angina, highlighting endovascular procedures as a first-line therapeutic option, with high short-term success and long-term patency.

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GIANT JUVENILE FIBROADENOMA IN A 12-YEAR-OLD GIRL: A CASE REPORT

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ABSTRACT

The Juvenile Giant Fibroadenoma (JGF) is a rare and benign clinical condition that affects young patients between the ages of 10 and 18. Histologically, it is characterized as a circumscribed lesion with rapid proliferation of the stromal and mammary epithelium, which may be associated with genetic mutations. For diagnosis, clinical and histological evaluation of the lesion is necessary to rule out other breast conditions, such as phyllodes tumor. In this case, it concerns a 12-year-old patient with a large lesion in the right breast, which appeared six months prior to the consultation. Ultrasonographic evaluation revealed a solid, hypoechoic mass with well-defined borders, which, along with the biopsy, confirmed the diagnosis of JGF. Given the characteristics of the lesion and its impact on the patient's life, a surgical approach was chosen, prioritizing the preservation of healthy breast tissue. The excised mass was anatomically analyzed and confirmed the diagnosis of JGF, ruling out other pathologies. Management of this condition requires a personalized approach that considers both the lesion's and the patient's characteristics to balance aesthetic concerns with breast health. In the reported case, the surgical approach resulted in a satisfactory outcome, addressing the medical, aesthetic, and psychosocial needs of the patient. This work, therefore, highlights the importance of early diagnosis and the multidisciplinary approach necessary for treating patients with JGF.

Keywords: Juvenile giant fibroadenoma; Benign breast neoplasm; Adolescent; Breast surgery; Ultrasonography.

INTRODUCTION

Fibroadenoma is a benign breast neoplasm characterized by the abnormal proliferation of epithelial and stromal tissue, representing one of the most common breast lesions in young women, particularly those under 30 years old.[1] These lesions show a preference for the left breast, especially in the upper outer quadrant, although they can occur in any breast region.[2] Simple fibroadenoma, the most prevalent form, accounts for 70% to 90% of cases, typically exhibiting slow growth with an average size ranging between 2 and 3 cm.[3]

A rare and clinically significant variant is the giant juvenile fibroadenoma, which accounts for 0.5% to 4% of fibroadenoma cases and predominantly affects patients aged 10 to 18 years.[4] This form is characterized by rapid growth, reaching diameters greater than 5 cm, a weight exceeding 500 g, or occupying more than 80% of the breast volume.[5] The etiology of giant juvenile fibroadenoma remains incompletely understood, but evidence suggests an association with hormonal imbalances, particularly an increased sensitivity to estrogens.[6,7]

The management of giant juvenile fibroadenoma presents unique challenges due to its potential to cause significant breast deformity, physical discomfort, and substantial psychosocial impact in adolescent patients. The therapeutic approach should consider not only the removal of the lesion but also the preservation of healthy breast tissue and the final aesthetic outcome.[8]

The differential diagnosis includes other benign and malignant breast lesions, such as juvenile phyllodes tumor, breast hamartoma, and, rarely, malignant neoplasms. Therefore, careful clinical, imaging, and histopathological evaluation is essential for accurate diagnosis and appropriate management.[1]

This case report aims to describe the clinical presentation, diagnostic approach, and therapeutic management of a 12-year-old patient with giant juvenile fibroadenoma in the right breast, with a six-month progression, who underwent definitive surgical treatment. Additionally, it seeks to discuss the clinical and psychosocial implications, as well as the therapeutic considerations specific to this age group, contributing to the body of knowledge on this rare and challenging condition.

LITERATURE REVIEW

Fibroadenomas are benign fibroepithelial lesions of the breast, characterized by the proliferation of epithelial and stromal tissue. They are typically found in young women and present as well-circumscribed, mobile masses in the breast. Histologically, they are composed of a biphasic proliferation of epithelial and stromal elements, originating from the terminal duct-lobular units. The size of these lesions typically ranges from 1 to 3 cm, but larger variants, such as giant juvenile fibroadenoma, may occur. Despite their benign nature, fibroadenomas can, in rare cases, present with atypical features, as observed in a case reported in a patient with Li-Fraumeni Syndrome.[9]

Fibroadenomas (FAs) constitute a significant proportion of benign breast lesions, representing approximately 68% of these cases. Their clinical presentation is variable, ranging from asymptomatic lesions to larger tumors that cause breast deformities with considerable aesthetic impact. In imaging evaluation, particularly in ultrasonography, FAs present distinctive features, often described as hypoechoic, well-circumscribed masses with an oval or rounded shape. These ultrasonographic characteristics are crucial for the differential diagnosis and appropriate clinical management of these lesions.[1] Elastography, an emerging imaging technique, has demonstrated high specificity in differentiating between benign lesions, such as fibroadenomas, and malignant lesions, thus complementing conventional ultrasonographic diagnosis.[10]

Giant juvenile fibroadenoma (GJF) represents a rare and clinically significant variant of fibroadenomas, accounting for 0.5% to 2% of all cases. This distinct form is characterized by a lesion with pronounced stromal and epithelial hypercellularity, with dimensions exceeding 5

cm in diameter or a weight surpassing 500g.[5] Histologically, GJFs exhibit a more pronounced proliferation of both the epithelial and stromal components compared to conventional fibroadenomas. Recent genetic studies have identified recurrent mutations in the MED12 and RARA genes in GJFs, suggesting a molecular basis for their distinct growth behavior.[11] Additionally, immunohistochemical analyses have shown increased expression of estrogen and progesterone receptors in these lesions, indicating a possible hormonal influence on their development and growth.[6]

Giant juvenile fibroadenoma (GJF) is predominantly observed in patients aged 10 to 18 years, with an increased incidence in African American women, suggesting possible genetic or environmental factors in its etiology. Clinically, GJFs are characterized by their rapid growth, representing the most common cause of unilateral macromastia in adolescents. The typical clinical presentation includes rapid and asymmetric breast enlargement, often unilateral, which can cause considerable anxiety in patients and their families.[6] Due to their rapid development and large volume, these lesions can reach significant proportions, occasionally associated with complications such as skin ulceration, necrosis, and local venous engorgement. The differential diagnosis includes other breast lesions such as juvenile phyllodes tumor, breast hamartoma, and, rarely, malignant neoplasms, making histopathological evaluation crucial for definitive diagnosis.[12]

The management of giant juvenile fibroadenomas (GJFs) has evolved significantly in recent years, with an increasing trend toward more conservative approaches. The initial evaluation typically includes imaging exams such as ultrasound and, in selected cases, magnetic resonance imaging (MRI). Ultrasound usually reveals a well-circumscribed, hypoechoic mass with smooth borders and posterior acoustic enhancement.[1] Biopsy is often required to confirm the diagnosis and rule out malignancy. Treatment options range from vigilant observation in selected cases to surgical intervention. Surgical techniques such as subareolar enucleation and reduction mammoplasty have been successfully employed, aiming to preserve breast tissue and achieve favorable aesthetic outcomes.[8] Post-treatment follow-up is essential, not only to monitor for potential recurrences but also to assess normal breast development and address any psychosocial concerns. A multidisciplinary approach involving surgeons, radiologists, pathologists, and psychologists is crucial to optimize outcomes and the overall well-being of patients with GJF.

Microscopically, giant juvenile fibroadenoma (GJF) exhibits distinct histological features that differentiate it from conventional fibroadenomas and other breast lesions. A frequently observed characteristic is the presence of usual ductal hyperplasia with micropapillary features, reflecting increased epithelial proliferation in these lesions.[12] This hyperplasia contributes to the structural complexity of the GJF and may play a significant role in its rapid growth. Another notable aspect is the stromal mitotic activity, which is typically low, usually presenting fewer than 2 mitoses per 10 high-power fields.[1] This low mitotic activity is an important criterion in differentiating GJF from potentially more aggressive lesions, such as juvenile phyllodes tumors. Additionally, the stroma of GJF often exhibits hypercellularity and may present areas of myxoid degeneration, features that contribute to the lesion's increased volume.[1] Immunohistochemical evaluation may reveal an increased expression of estrogen and progesterone receptors in both the epithelial and stromal components, suggesting heightened hormonal sensitivity that could

explain the accelerated growth typical of these lesions in adolescents.[6]

Although giant juvenile fibroadenoma (GJF) is generally considered an isolated condition, in rare cases, it may be associated with specific genetic syndromes, thus broadening the differential diagnostic spectrum.[12] Among these are Beckwith-Wiedemann syndrome, characterized by macrosomia and a predisposition to embryonal tumors[13]; Cowden syndrome, associated with mutations in the PTEN gene and an increased risk of benign and malignant breast lesions[14]; Maffucci syndrome, marked by multiple enchondromas and hemangiomas[15]; and McCune-Albright syndrome, which features fibrous dysplasia of the bones and precocious puberty.[16] Additionally, isolated cases of GJF have been reported in patients with Neurofibromatosis type 1 and Li-Fraumeni syndrome.[9] Recognizing these rare associations is crucial for comprehensive clinical management, as it may influence not only the treatment of GJF but also guide the investigation of other potentially associated systemic manifestations, as well as provide a basis for genetic counseling. Therefore, in the presence of a GJF case, particularly when accompanied by atypical clinical features or a suggestive family history, consideration of these rare diagnoses becomes relevant.

CASE REPORT

Patient YVPS, female, 12 years old, without comorbidities, menarche at 10 years, with a family history of benign breast nodule (aunt). She presented to the consultation with a mastologist reporting cyclical breast edema since the age of 11, with spontaneous resolution after menstruation. In June 2024, she noticed progressive growth of the right breast, accompanied by pruritus, local erythema, the appearance of stretch marks, and denied nipple discharge or mastalgia. Upon physical examination, there was breast asymmetry, with the right breast showing significant volume increase, flattened nipple, erythematous skin with fine desquamation, and presence of violaceous stretch marks. The temperature was elevated to touch, but it was painless upon palpation.

Ultrasound (Figures 1 and 2) showed breasts with a predominance of fibroglandular echotexture and moderate fatty replacement. The right breast presented with a nodular lesion (6.8 x 4.5 cm), solid, palpable, hypoechoic, with well-defined margins, and a slight vascular flow inside, involving the lateral quadrants. BI-RADS classification 4A. Given the clinical presentation, the main diagnostic hypothesis was juvenile giant fibroadenoma. Surgical resection was recommended due to the large size of the lesion (Figure 3).

Figure 1 and 2 – Preoperative Ultrasound

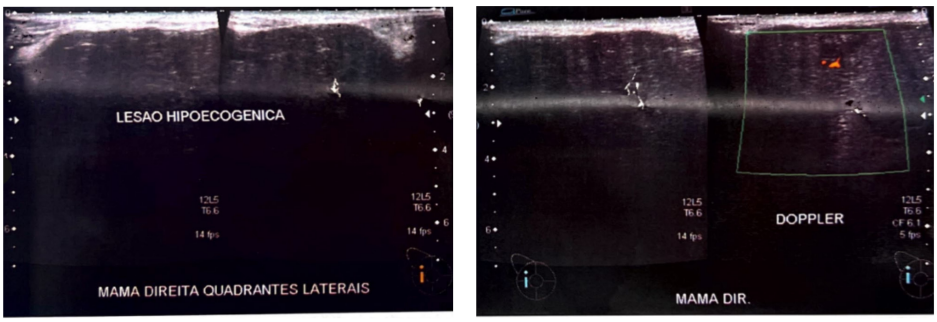
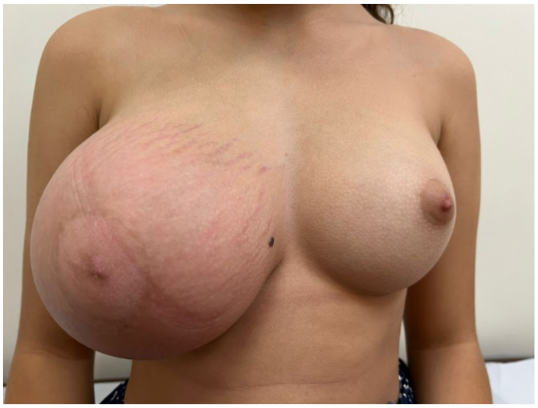
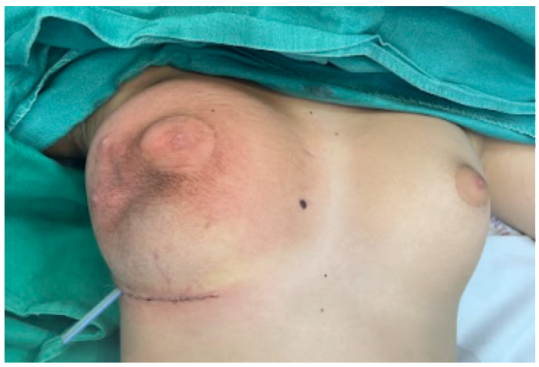


Figure 3 – Lesion before surgical excision



The chosen surgical technique was a simple mastectomy with preservation of the skin and the areolar-papillary complex. The incision was made in the inframammary fold, as it provides an excellent aesthetic result and facilitates future reconstruction if necessary, in addition to reducing the risk of contractures (Figure 4).

Figure 4 – Immediate result after excision.



Macroscopically, the specimen received in formalin consists of a segment of tissue with a nodular shape, brownish-white coloration, and rubbery consistency, measuring 14.5 x 13.0 x 3.8 cm at its largest dimensions (Figures 5 and 6). Upon sectioning, the surface appears homogeneous, solid, and brownish-white. Part of the material was submitted for histological examination (5 blocks; 5 fragments), using hematoxylin and eosin (H&E) staining. The histological analysis of the surgical specimen showed benign breast tissue with a nodular, pseudo-encapsulated arrangement, exhibiting loose, delicate fibrocellular stroma, sometimes with a reticulated pattern and slight increase in cellularity surrounding glandular spaces. These spaces are lined by a dual population of cells with various shapes, including rounded, oval, or narrowed, collapsed lumens with a cord-like pattern. The histopathological findings are consistent with a giant juvenile fibroadenoma.

Figure 5 and 6 – Surgical specimen

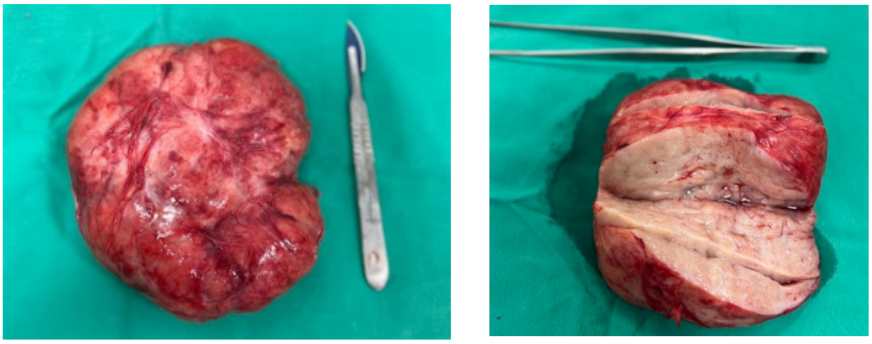
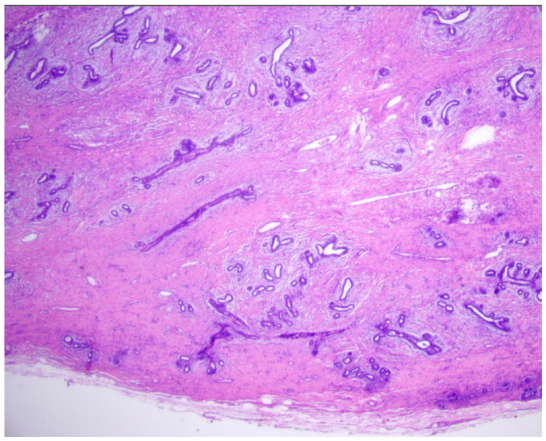


Figure 7 – Histopathological slide showing a well-circumscribed fibroadenoma, hypercellular stroma, and pericanalicular growth pattern.



Figures 8 and 9 – Histopathological slide at higher magnification, highlighting hypercellular stroma and pericanalicular growth pattern.

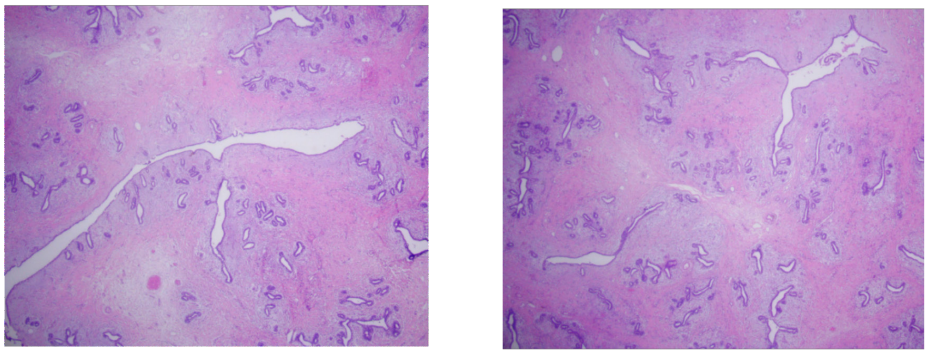
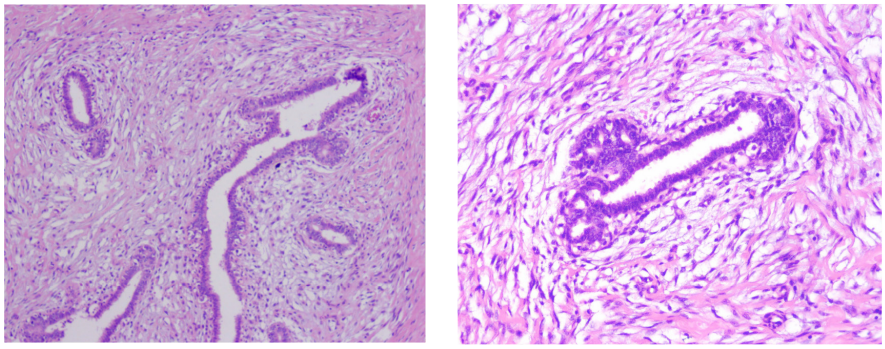
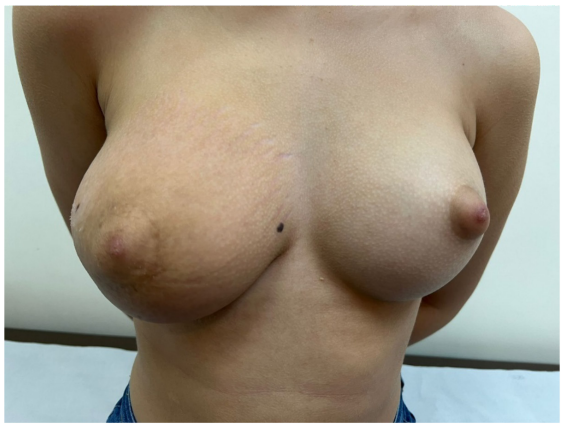


Figure 10 – Histopathological slide showing increased stromal cellularity, pericanalicular growth pattern with conspicuous epithelial hyperplasia, as well as ducts with micropapillary hyperplasia.



In the late postoperative period, approximately two weeks after the surgical resection, the patient showed satisfactory healing, and the right breast exhibited a significant reduction in volume (Figure 11).

Figure 11 - Late postoperative period.



DISCUSSION

The case report presents a typical example of juvenile giant fibroadenoma (JGFA), a rare variant of fibroadenoma that poses a significant diagnostic and therapeutic challenge, particularly in adolescent patients. The patient's clinical presentation, with rapid and unilateral breast growth, is consistent with the typical characteristics of JGFA described in the literature.[5]

The patient's age (12 years) falls within the most commonly affected age range for JGFAs, which spans from 10 to 18 years.[4] The history of cyclic breast edema prior to the rapid growth could suggest increased hormonal sensitivity of the breast tissue, a factor often associated

with the development of JGFAs.[6]

The ultrasound findings observed in this case, including a solid, hypoechoic, and well-defined nodular lesion, are typical of JGFAs and align with descriptions found in recent studies.[1] The BI-RADS 4A classification, indicating a low suspicion of malignancy, is appropriate for this type of lesion, although it highlights the importance of histopathological confirmation.

The decision to perform surgical resection was based on the significant size of the lesion (6.8 x 4.5 cm) and the aesthetic and potentially psychological impact on the patient. This approach aligns with current recommendations for the management of large-volume JGFAs.[8] However, it is important to note that more conservative techniques, such as subareolar enucleation, have been increasingly successfully employed in selected cases, aiming to preserve breast tissue and optimize aesthetic outcomes.[6]

Post-operative management and long-term follow-up are crucial aspects that deserve attention. Monitoring normal breast development, evaluating potential recurrences, and providing psychological support are essential elements in the ongoing care of these patients.

This case contributes to the body of knowledge on giant juvenile fibroadenomas (FGJs) by emphasizing the importance of early diagnosis, careful imaging evaluation, and appropriate surgical approach. Additionally, it highlights the need for a multidisciplinary approach in managing these lesions, involving breast specialists, surgeons, radiologists, pathologists, and, when necessary, geneticists and psychologists.

Future studies focused on minimally invasive surgical techniques and understanding the molecular mechanisms underlying the development of FGJs may help further improve the management of this rare but clinically significant condition.

CONCLUSION

Giant juvenile fibroadenoma is a rare condition that, due to its rapid growth and potential aesthetic and psychosocial impact, requires early diagnostic intervention and assertive therapeutic management. Existing literature suggests that whenever possible, surgical resection with preservation of breast tissue and the areola-papillary complex is the recommended approach, to minimize deformities and functional complications. The surgical treatment in this patient proved effective, achieving both aesthetic and functional goals. The patient is satisfied and showing good clinical progress.

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RELAPSING POLYCHONDRITIS AND THE CHALLENGE OF DIAGNOSIS: AN EXPERIENCE REPORT

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ABSTRACT

Relapsing polychondritis (RP) is a rare and chronic inflammatory disease characterized by recurrent inflammation of cartilage, primarily affecting the joints, ears, and respiratory airways. Diagnosis is challenging as its symptoms can be confused with other autoimmune conditions. The clinical presentation is variable, including joint pain, hearing loss, skin rashes, and respiratory difficulties. Treatment for RP involves the use of immunosuppressive medications such as corticosteroids, and in more severe cases, methotrexate and cyclophosphamide. Biological therapies have also been successfully employed. This case report discusses a patient with a previous diagnosis of severe refractory asthma, who, after further investigation, was diagnosed with relapsing polychondritis. The patient presented persistent symptoms, such as cough, respiratory difficulty, and nasal changes, which led to the change in diagnosis. Treatment with pulse therapy and immunosuppressive medications was initiated, resulting in clinical improvement. The report highlights the importance of early diagnosis, multidisciplinary follow-up, and personalized treatment, emphasizing the challenges in managing the disease, the need for rigorous monitoring, and the relevance of patient education for treatment adherence and quality of life improvement.

Keywords: Relapsing polychondritis, Early diagnosis, Immunosuppressive treatment.

INTRODUCTION

Relapsing Polychondritis (RP) is a rare and chronic inflammatory disease characterized by recurrent inflammation of the cartilage, especially in the joints, ears, and respiratory airways. The condition is difficult to diagnose, as its symptoms can be mistaken for other autoimmune and rheumatological disorders. The relapsing nature and variable course of the disease require careful and individualized management, aiming to control inflammation and prevent irreversible damage to the affected structures. The clinical presentation is broad and can range

from joint symptoms to more severe complications, such as respiratory problems, making diagnosis and treatment challenging.[1]

Early recognition of RP is crucial for improving patient prognosis, as the disease tends to cause permanent deformities and complications that affect quality of life. Among the most common early manifestations are joint pain, fever, skin rashes, and otolaryngological symptoms such as hearing loss and ear pain, as well as respiratory changes, such as difficulty breathing and airway stenosis. Because it is a disease with symptoms similar to various inflammatory conditions, careful differential diagnosis is required, involving clinical evaluation, laboratory tests, and often biopsies of the affected areas.[2]

The treatment of RP is based on the use of immunosuppressive medications, aiming to control inflammation and prevent further relapses. Corticosteroids, such as prednisone, are frequently used in high doses, but disease management may require the use of more potent immunosuppressive drugs, such as methotrexate or cyclophosphamide, depending on the severity and recurrence of episodes. In some cases, biological therapies have been successfully employed, offering new perspectives for disease control. However, treatment is often challenging, as patients may have varied responses to medications and experience significant adverse effects.[3]

This experience report aims to share the lived experiences of patients with relapsing polychondritis, highlighting the challenges faced in diagnosis and the therapeutic options adopted. Based on this clinical experience, the goal is to provide a comprehensive view of the disease's progression, its implications for treatment, and the importance of multidisciplinary follow-up in managing this condition. The report also seeks to contribute to the understanding of the clinical variability of RP and the need for personalized treatment.

The report also discusses the importance of early therapeutic strategies to prevent permanent sequelae and ensure a better quality of life for the patient. By addressing the challenges faced by both the medical team and the patient, the aim is to offer a reflection on the importance of early diagnosis, appropriate treatment, and continuous patient guidance—key aspects for successful management of relapsing polychondritis.

EXPERIENCE REPORT

A young patient, with a prior diagnosis of severe asthma, had multiple visits to the emergency room and frequent episodes of wheezing and dyspnea since 2019, with a significant worsening over the last 12 months and daily asthma attacks. The condition was exacerbated after a COVID-19 infection in 2020. The daily therapeutic regimen included Alenia, Clenil, and Aerolin, but the patient reported worsening cough with Alenia. A recent spirometry revealed severe obstructive ventilatory disorder. After hospitalization, bronchodilator therapy was initiated, along with treatment for bacterial tracheobronchitis with Tazocin. However, the patient showed refractoriness to bronchodilator measures for severe asthma, with continuous episodes of severe bronchospasm, coarse crackles, diffuse rhonchi, and wheezing.

Due to the persistence of symptoms, a triple therapy was initiated with Trimbow, Clenil, Tiotropium, Salbutamol, and Prednisone. A chest computed tomography (CT) with 3D reconstruction revealed a significant reduction in the caliber of the lower airways, suggesting tracheobronchial chondritis. The patient presented with a saddle nose, persistent cough,

thickening, and calcification of the tracheal wall. The suspicion of relapsing polychondritis was confirmed based on the clinical criteria of McAdam and Damiani and Levine, in addition to the exclusion of other autoimmune conditions with a negative ANCA.

According to McAdam's criteria, the patient met two criteria (nasal and respiratory chondritis). The criteria of Damiani and Levine also confirmed the diagnosis, as they showed chondritis in two distinct anatomical regions with a response to corticosteroids.

Based on the diagnosis, pulse therapy with methylprednisolone was initiated for three days. During hospitalization, the patient developed an Influenza A infection, which was treated with oseltamivir. Later, a multisensitive Pseudomonas aeruginosa infection was diagnosed and treated with levofloxacin. The immunosuppressive therapy included methotrexate, folic acid, prednisone, Trimbow, and Clenil, resulting in gradual improvement. The patient was advised on tracheostomy in case of refractoriness and was discharged for outpatient follow-up with Pulmonology and Rheumatology.

DISCUSSION

There is diagnostic complexity in patients with relapsing polychondritis (RP) due to symptom overlap with other conditions, such as severe asthma. The diagnosis was made more difficult by multiple visits to the emergency room and lack of consistency in the doctor-patient relationship. The presence of multiple complications, such as nasal and tracheobronchial chondritis and structural changes detected on the CT scan, raised the suspicion of RP.[4,5]

RP is a rare autoimmune disease, and its confirmation requires access to advanced tests and a multidisciplinary team.[6] This case highlights the need for a robust differential diagnosis in patients with chronic respiratory symptoms and a history of refractoriness to standard treatment. The involvement of distinct anatomical areas, such as the airways and nasal cartilage, was essential for confirmation based on the McAdam and Damiani and Levine criteria.[7,8]

Proper management requires vigilance for infectious complications, as immunosuppressive treatments, such as methotrexate and corticosteroids, increase susceptibility to infections.[9] A multidisciplinary approach with Pulmonology and Rheumatology, along with outpatient follow-up, is essential to prevent recurrences and adjust therapeutic management.[10]

Casos como este reforçam a importância de investigar associações entre PR e outras manifestações sistêmicas, como oftalmológicas e neurológicas, destacando a relevância do diagnóstico precoce para evitar complicações graves e otimizar a qualidade de vida do paciente.

CONCLUSIONS

This experience report highlights the importance of early diagnosis and proper management of relapsing polychondritis, a rare and challenging condition for both healthcare professionals and patients. This case underscores the importance of thorough investigation in patients diagnosed with severe asthma refractory to optimized treatment, especially in cases where symptoms persist despite appropriate behavioral and environmental changes and optimized therapy.

Relapsing polychondritis, an autoimmune and progressive disease, if not diagnosed and treated appropriately, can lead to severe complications. A differentiated approach and careful review of the diagnosis are essential to ensure symptom control and the patient's quality of

Effective treatment requires a personalized approach, considering the relapsing nature and the diversity of clinical manifestations of the disease. The use of immunosuppressive medications, along with strict follow-up, is crucial to control inflammatory episodes and minimize irreversible damage to the affected structures.

Despite advances in treatment, the clinical variability of relapsing polychondritis makes disease control complex, with many patients facing difficulties with medication side effects and frequent relapses. Therefore, the need for a multidisciplinary approach, involving rheumatologists, otolaryngologists, pulmonologists, and other specialists, is essential to ensure effective treatment and the best possible prognosis for the patient. Furthermore, psychological support and patient education about the disease are crucial to improve treatment adherence and quality of life.

The control of inflammation and the prevention of new episodes are the pillars of managing relapsing polychondritis, and the combination of conventional and biological therapies offers new perspectives in the treatment of the disease. Finally, this report contributes to the understanding of the nuances of relapsing polychondritis and serves as a reference for healthcare professionals dealing with similar cases. The constant evolution in the understanding of the disease and therapeutic options is essential to provide patients with a more balanced life and reduced impact from complications. Ongoing education about the disease and advances in treatment are crucial to achieving better clinical outcomes and promoting patients' quality of life.

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THE MANAGEMENT OF A PATIENT WITH TRAUMATIC BRAIN INJURY AND ACUTE NEUROLOGICAL CONDITION PROGRESSING TO STATUS EPILEPTICUS: EXPERIENCE REPORT

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ABSTRACT
This report describes the case of a patient with a history of chronic diseases, who suffered a traumatic brain injury and presented a complex clinical picture, with possible diagnosis of subarachnoid hemorrhage (SAH), viral encephalitis, brain metastasis, and paraneoplastic encephalitis. The diagnostic approach involved complementary tests and the progression of the condition, focusing on neurological management and complications associated with the patient's condition. After investigation, a diagnosis of status epilepticus was confirmed; however, the patient passed away after 18 days of hospitalization. It was possible to identify the importance of early diagnosis and timely treatment to prevent complications of the condition, such as death.

Keywords: Status epilepticus, Complications of status epilepticus, Death.

INTRODUCTION

Acute neurological conditions encompass a range of severe disorders that require immediate recognition and rapid intervention, as the patient's life is often at risk. Among these emergencies, status epilepticus (SE) stands out as a potentially fatal condition characterized by prolonged seizures that demand intensive management. SE is defined as a seizure lasting more than 30 minutes or multiple consecutive seizures without full recovery between them, representing one of the most critical manifestations of epilepsy.[1]

The pathophysiology of status epilepticus involves electrical dysregulation in the brain, resulting in excessive and persistent neuronal activity. This phenomenon can be triggered by various causes, such as traumatic injuries, central nervous system infections, metabolic disorders, or even as a complication of uncontrolled epileptic seizures. The lack of appropriate treatment can lead to a cascade of harmful effects, including neuronal death and irreversible brain tissue damage, thereby increasing the morbidity and mortality associated with this condition.[2]

Clinically, status epilepticus manifests as continuous seizures that can affect both motor and cognitive functions of the patient. In addition to motor seizures, patients may present with altered levels of consciousness, respiratory difficulties, and cardiovascular instability. Early identification and differentiation between status epilepticus and other acute neurological conditions are crucial for the implementation of effective treatment. In this context, rapid diagnosis, often based on clinical history and physical examination, is essential, as delays in therapeutic intervention can result in permanent damage to the central nervous system.[3]

The treatment of status epilepticus is one of the greatest challenges in neurological clinical practice. Proper management requires the use of high-dose anticonvulsants and, in some cases, adjunct therapies such as general anesthesia, especially when SE is refractory to medications. Controlling seizures is essential to prevent sequelae such as cognitive, motor, and behavioral deficits, as well as systemic complications like respiratory failure and shock. Treatment must be tailored to the patient's profile and the underlying causes of status epilepticus.[4]

This report aims to discuss the clinical and therapeutic aspects of status epilepticus in a patient in an intensive care unit, with an emphasis on early identification, emergency management, and specific interventions. It will address the main causes leading to the development of SE and the diagnostic challenges faced by healthcare professionals. A thorough understanding of status epilepticus is essential to improve prognosis and reduce the complications associated with this severe neurological emergency.

EXPERIENCE REPORT

A 67-year-old male patient with a history of chronic kidney disease (CKD), systemic arterial hypertension (SAH), and prostate cancer undergoing chemotherapy (goserelin acetate 10.8 mg every three months) presented to the hospital. His regular medications included amlodipine, allopurinol, bicarbonate, epoetin alfa, iron oxide saccharate, and acetylsalicylic acid. The patient was admitted following a fall from standing height 7 days prior, presenting with a facial hematoma, progressive alteration in consciousness, and difficulty ambulating. He reported no recollection of the fall and denied headache, chest pain, or dyspnea. He sought hospital care due to reported paresthesia on the right side of his face, which had led to the interruption of hemodialysis, prompting referral to the hospital.

At the time of evaluation, the patient was alert but confused, with a presentation possibly secondary to trauma or neurological complications. On physical examination, the patient appeared to be in fair general condition, somnolent, non-icteric, acyanotic, and afebrile. The remaining findings are detailed below:

- Blood Pressure: 177/97 mmHg
- Heart Rate: 89 bpm
- Respiratory Rate: 17 breaths per minute
- Glasgow Coma Scale: 14
- Oxygen Saturation on O2: 95%
- Neurological: Glasgow 14, no motor deficits, no signs of meningeal irritation
- Cardiovascular: regular heart rhythm, no murmurs
- Respiratory: bilateral vesicular breath sounds present, no adventitious sounds

- Extremities: no edema, calves free of tenderness

The initial management for the condition was the transfer to the Intensive Care Unit (ICU). The patient was admitted to the ICU in fair general condition, with a Glasgow score of 14 and acute cognitive alteration, being monitored and maintained in an intensive support environment. The initial decision was for continuous observation with investigation into possible causes of his neurological manifestations. Investigations were conducted with the aid of imaging and laboratory tests, as outlined in the tables.

The patient maintained mental confusion and developed agitation within the first 24 hours of hospitalization but remained eupneic with 2 liters of oxygen via nasal cannula and a good respiratory pattern. In the ICU, in addition to vasoactive medications for vital sign control, acyclovir was initiated due to the diagnostic hypothesis of viral encephalitis. After 48 hours of hospitalization, the patient progressed to myoclonus and recurrent seizures, requiring orotracheal intubation. A neurology consultation was requested.

The patient exhibited coughing during tube aspiration and biting, but did not present new episodes of myoclonus. After 4 days of hospitalization, attempts to wake the patient by reducing sedation were made, but without effective results. According to the neurology consultation, valproic acid 250 mg/5 ml was initiated, prescribed at 5 ml every 12 hours, and clobazam 10 mg every 12 hours. On neurological physical examination: global hyporeflexia, absence of clonus, Hoffman sign absent, plantar cutaneous reflex indifferent. The patient also presented normal muscle tone, no rigidity, miotic pupils, isocoric, with poor photoreactivity, corneal-palpebral reflex present, and absence of the oculocephalic reflex (doll's eyes maneuver). There was no nystagmus, no ocular deviation, absence of pupillary hippus, and no involuntary movements were observed.

Laboratory tests and serologies were requested as per Table 3, considering the hypotheses of seizures to be clarified, paraneoplastic encephalitis, carcinomatous meningitis, and infectious encephalitis. Given the negative VDRL result in both blood and cerebrospinal fluid (CSF), the possibility of neurosyphilis (which could present with seizures and elevated protein levels in CSF) was ruled out. Therefore, following the negative neurosyphilis test, the patient continued on acyclovir for the differential diagnosis of herpes encephalitis. Elevated protein levels in CSF can also occur in isolation in cases of seizures of any etiology, even if caused by a metabolic disturbance, for example. After several attempts at extubation, the patient continued to exhibit a decreased level of consciousness (LOC) even after sedation was discontinued, leading to the consideration of toxic-metabolic encephalopathy or non-convulsive status epilepticus as potential diagnoses.

Upon re-evaluation after 9 days of hospitalization, the patient presented with new episodes of seizures accompanied by myoclonus. Laboratory tests revealed a reactive FTA-Abs IgG, and a consultation with infectious disease specialists was requested. They initiated crystalline penicillin for the treatment of neurosyphilis. During the physical examination, the patient experienced two generalized myoclonic seizures, each lasting 5 seconds.

Table 1 - Tests performed upon admission on July 22, 2024

Test	Result	References
Hemoglobin	11,1	12,8 - 17,8 g/dL
Hematocrit	33,0	40 – 50 %
Leukocytes	6.630	3600 - 11000/mm3
Platelets	132.000	150.000 - 400.000/mm3
Lactate	1,86	0,5 - 2,2 mmol/L
pH (venous)	7,42	7.350 – 7.450
PCO2 (venous)	42,5	35 – 45 mmHg
HCO3 (venous)	26,2	21 – 27 mEq/L
Saturation (venous)	98%	95 – 100%
Total Bilirubin	0,50	0,3 – 1,2 mg/dL
Direct Bilirubin	0,39	0,1 a 0,4 mg/dL
Indirect Bilirubin	0,11	< 1,2 mg/dL
Sodium	143	135 – 145 mmol/L
C-Reactive Protein	0,5	Menor que 6 mg/L
Calcium	1,16	1,17 - 1,30 mmol/L
Potassium	4,1	3,5 – 5,5 mmol/L
Magnesium	2,0	1,7 - 2,4 mg/dL
Prothrombin Time (PT)	11,1 seconds	12,7 to 15,2 seconds
Activated Partial Thromboplastin Time (aPTT)	22,7 seconds	24 the 40 seconds
INR	1,01	0,8 – 1
Creatine Phosphokinase (CPK)	22	29 – 168 U/L
Creatine Phosphokinase MB (CKMB)	9	< 5 ng/mL
Troponin	Negative	Negative
Creatinine	5,26	0,80 a 1,30 mg/dL
Urea	69	15 a 45 mg/dL

Source: Elaborated by the author.

Table 2 - Cerebrospinal Fluid (CSF) Test on 23/07/2024

Test	Result	References
Glucose	64	40–80 mg/dL
Protein	88	15–60 mg/dL
VDRL	Negative	Negative
Cell Count	4	0-5 lymphocytes/mcL

Source: Elaborated by the author.

Table 3 - Tests performed in July 2024

Test	Result	References
HbsAg	Non-Reactive	Non-Reactive
Anti-HBs	Non-Reactive	Non-Reactive
Anti-HBc IgM and IgG	Non-Reactive	Non-Reactive
Anti-HCV	Non-Reactive	Non-Reactive
VDRL	Non-Reactive	Non-Reactive
FTA Abs IgG	Reactive	Non-Reactive
CSF Viral Panel	Negative	Negative
CSF Cysticercosis	Negative	Negative

Source: Elaborated by the author.

CT Scan of the Brain 22/07/2024

Reduction in the volume of the encephalic parenchyma, with prominence of the cerebral sulci and fissures, as well as the cerebellar folia, leading to compensatory ectasia of the supratentorial ventricular system. Sparse hypodense foci in the supratentorial white matter, without significant atrophic or expansive effects, nonspecific, but possibly corresponding to gliosis/microangiopathy. Basal ganglia and capsular regions appeared preserved. Midline structures are centered. The fourth ventricle was in its usual location, with normal dimensions. No evident lesions in the posterior fossa by this method. Incipient atheromatous plaques in the carotid siphons. Absence of intracranial hematomas.

MRI of the Brain 24/07/2024

No acute ischemic vascular insults were characterized in the present study. Foci of signal alteration in the hemispheric white matter, nonspecific, usually resulting from chronic microvascular changes / gliosis (Fazekas 2). Image suggestive of an ischemic lacune in the left lentiform nucleus. Encephalic volume reduction, expected for the age group. Important clinical correlation.

Electroencephalogram performed on 02/08/2024

The EEG showed regular, continuous, symmetrical, and disorganized baseline activity with a burst-suppression pattern. During the bursts, there is a predominance of diffuse, irregular delta rhythms, interspersed with diffuse, irregular theta rhythms. Epileptiform activity of the slow-wave spike-and-wave type is frequent in the right frontal region. Three seizures were observed. The seizures had an ictal onset in the right cerebral hemisphere with higher amplitude in the temporal region in the theta range.

The electrographic end was characterized by two seizures with a slow-wave spike-and-wave pattern in the right temporal region and one seizure with a beta rhythm. The seizures lasted from 1 to 2 minutes. The intermittent photic stimulation did not alter the tracing. The

auditory and painful stimuli did not modify the tracing. Brain mapping and spectral analysis revealed a dominant rhythm of 1.50Hz and 25.1μV. Cerebral topography revealed the following predominant potentials with their respective locations: Delta 29.5μV in O2, Theta 18.1μV in F8, Alpha 10.8μV in O2, Beta 12.9μV in OZ. Conclusion: The EEG shows disorganization of the baseline activity with a burst-suppression pattern. Three electroclinical seizures were observed.

Case progression

The patient remained in the ICU for 18 days, evolving with a severe general condition, but hemodynamically stable and without the use of vasopressor drugs. Nevertheless, the patient continued on mechanical ventilation with the need for a tracheostomy and sedation. The patient remained 48 hours without vasopressor drugs and was on valproic acid, clobazam, phenobarbital, and levetiracetam due to persistent myoclonus. The patient also continued with dialysis as per nephrology guidance (dialysis-dependent chronic kidney disease).

After this period, the patient progressed in less than 10 hours to the absence of vital signs on the monitor. Central pulses were checked, and they were absent. The monitor showed a rhythm of asystole. In light of this situation, a cardiopulmonary resuscitation protocol was initiated as per Advanced Cardiovascular Life Support (ACLS). Additionally, sodium bicarbonate infusion was performed to correct metabolic acidosis. Despite the support, after 40 minutes of the protocol, the patient remained in asystole. Pupils were checked and found to be dilated and non-reactive to light, with no return of spontaneous circulation. Therefore, the patient's death was confirmed, and the death certificate was filled out.

DISCUSSION

Status epilepticus (SE) is a serious and potentially fatal neurological condition characterized by the persistence of seizures or the occurrence of repeated seizures without return to consciousness. Its pathophysiology involves an imbalance between excitatory and inhibitory mechanisms in the brain, leading to neuronal hyperexcitability and the propagation of epileptic discharges.[5]

The main cause of this imbalance is the deficiency of inhibitory neurotransmitters, such as GABA (gamma-aminobutyric acid), and the increased activity of excitatory neurotransmitters, such as glutamate. Understanding the mechanism of status epilepticus (SE) was crucial in deciding the appropriate treatment, as prolonged seizures, such as those observed in this patient, can lead to permanent brain damage if not rapidly controlled. This alteration results in disorganized electrical activity in the brain areas responsible for motor coordination and cognition, such as the cerebral cortex, hippocampus, and thalamus. If status epilepticus is not quickly controlled, irreversible brain damage can occur due to the high metabolic demand of neuronal cells, leading to neuronal cell death and impairment of cognitive and motor functions.[6]

The symptoms of status epilepticus vary depending on the affected brain area but typically include prolonged or repeated seizures. Additionally, the patient often experiences loss of consciousness and may develop autonomic changes such as tachycardia, hypertension, hypotension, or excessive sweating. In severe cases, the patient may experience hypoxemia and respiratory failure due to the disruption of normal ventilation. The postictal syndrome,

characterized by confusion, drowsiness, and memory difficulty, can persist for hours after the seizure. Furthermore, patients with status epilepticus may experience acute cognitive impairment, leading to difficulties with orientation and reasoning. The clinical picture may be exacerbated in non-convulsive seizures, where mental alteration may be the only visible sign of the condition.[3]

The diagnosis of status epilepticus is primarily clinical, based on the patient's history and observation of the seizures. To confirm the diagnosis and monitor brain activity, electroencephalography (EEG) is crucial. The EEG reveals continuous epileptic activity, which is characteristic of status epilepticus. In cases where the seizure is not easily detected, such as in non-convulsive status epilepticus, the EEG may be the only indicator of abnormal brain activity. As presented by the patient in question, in the reported experience, after excluding other diagnostic possibilities, abnormal activity was identified in the EEG.[7]

Additionally, imaging exams such as computed tomography (CT) or magnetic resonance imaging (MRI) can be useful in identifying underlying structural causes, such as tumors or brain infections, that may be contributing to the condition. Other laboratory tests, such as complete blood count, blood gas analysis, liver and kidney function, and glucose levels, are important to assess the metabolic and systemic conditions that may exacerbate the epileptic status. The EEG is the diagnostic test of choice for confirming the diagnosis of status epilepticus. It helps identify patterns of epileptic discharges that are indicative of continuous abnormal neuronal activity. CT or MRI of the brain are important to rule out structural causes such as tumors, abscesses, or brain hemorrhages, which may predispose to epileptic episodes.[1]

Additionally, laboratory tests, including sodium, calcium, glucose, and renal and liver function, are essential to detect metabolic or toxic disturbances that may contribute to the status epilepticus. Arterial blood gas analysis is relevant to assess respiratory changes, such as hypoxemia, which can worsen the patient's condition. Finally, toxicological tests may be necessary to rule out intoxications with drugs that induce seizures.[4]

The differential diagnosis of status epilepticus should include several neurological and systemic conditions that may present with similar symptoms. Syncope (brief loss of consciousness) can mimic epileptic seizures, but it is usually of short duration and is not associated with convulsive movements. Stroke (CVA), especially when it involves motor areas, can result in loss of consciousness and involuntary movements, but it is not typically accompanied by continuous electrical activity as seen in status epilepticus.[3]

Metabolic disorders, such as hypoglycemia or hyponatremia, can also cause neurological symptoms similar to seizures, but the difference is that there are no EEG changes typical of seizures. Hypoxia, caused by severe respiratory failure, can lead to loss of consciousness, but it is not associated with continuous epileptic discharges. Finally, psychoses or panic attacks may result in mental confusion, but they lack the objective signs of seizures or abnormalities on the EEG.[8]

The treatment of status epilepticus aims to quickly and effectively stop the seizures to prevent severe complications, such as permanent brain damage. The initial approach involves the intravenous administration of benzodiazepines, such as lorazepam or diazepam, which have a rapid and effective effect on epileptic activity. If status epilepticus persists, additional medications, such as phenytoin or fosphenytoin, may be used for long-term control. In refractory cases, where seizures do not respond to conventional treatments, barbiturates

(such as phenobarbital) or anesthetic agents, like propofol, may be required.[8,9]

The biggest challenge was dealing with refractory status epilepticus. The conventional treatment, which initially included benzodiazepines and antiepileptic drugs, was not sufficient to stop the seizures. This required a more aggressive approach with the use of barbiturates and propofol, which are often used in refractory status epilepticus cases but also present risks, such as respiratory depression and hypotension.[10]

This experience gave me a deeper understanding of therapeutic options in refractory status epilepticus, as well as highlighting the importance of well-structured protocols and interdisciplinary collaboration to ensure the success of treatment. More recent strategies include the use of cannabinoids for refractory epilepsies and therapy with topiramate to prevent subsequent seizures.[4,8] Careful monitoring of vital signs, respiratory function, and metabolic conditions is essential during treatment.

Status epilepticus can lead to severe complications if not treated appropriately. These complications include irreversible neuronal damage, hypoxia due to disruption of normal ventilation, respiratory failure, and hypotension. The patient may also develop cardiovascular complications, such as arrhythmias, and a stroke (CVA) due to the increased metabolic demand in the brain.[4,8]

Additionally, refractory status epilepticus (when treatment is ineffective) can lead to permanent cognitive sequelae, such as memory difficulties, disorientation, and motor deficits. The mortality associated with status epilepticus is significant, particularly in patients with comorbidities or in refractory states, and can be exacerbated by conditions such as infections and uncorrected metabolic disorders2. Furthermore, the need for adjustments in long-term medications was discussed with the medical team, considering the patient had a history of hypertension, chronic kidney disease, and prostate cancer being treated with chemotherapy. The use of antiepileptics could interact with other ongoing therapies, requiring close monitoring of renal function and drug levels. Despite the team's efforts, the patient progressed to death after 18 days.

FINAL CONSIDERATIONS

This clinical case illustrates the complexity of managing patients with traumatic brain injury in the presence of comorbidities and oncological treatments, making the experience complex and requiring delicate management. Early identification of potential causes of cognitive and neurological alterations is crucial for appropriate treatment and prevention of complications. The patient's progression depends on the integrated management of underlying conditions, such as prostate cancer, kidney disease, and blood pressure control, in addition to strict monitoring in the ICU.

Status epilepticus is a neurological emergency with an imminent risk of severe complications, including irreversible brain damage, respiratory failure, and mortality. Its pathophysiology is related to an imbalance between excitatory and inhibitory activity in the brain, leading to continuous convulsive activity. The diagnosis is primarily confirmed through EEG, with early recognition and rapid treatment being essential to prevent damage. Initial therapies include benzodiazepines, followed by other antiepileptic drugs in refractory cases.

This experience was crucial for gaining a deeper understanding of status epilepticus and therapeutic approaches in a real-life scenario. The use of benzodiazepines and antiepileptic drugs, followed by more invasive interventions such as propofol and phenobarbital, proved effective but also highlighted the challenges associated with treating refractory status epilepticus. Continuous monitoring of respiratory function, vital signs, and careful observation of postictal complications were essential in managing the patient. Collaboration among intensive care teams, neurologists, and other specialists was key to patient care, and this experience provided a more holistic view of managing this neurological emergency.

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SCIENTIFIC ARTICLE -EXPERIENCE REPORT

HEMODIALYSIS AND ITS FINANCING IN BRAZIL: EXPERIENCE REPORT

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ABSTRACT

Introduction: Chronic Kidney Disease is defined as the progressive and irreversible loss of kidney function. Data established by the Brazilian Society of Nephrology (SBN), published in 2023, showed that by 2022 there were more than 150 thousand patients undergoing dialysis treatment in Brazil. Despite its relevance, insufficient funding for Renal Replacement Therapy (RRT) has generated increasing challenges to ensure adequate care for chronic kidney patients, especially given the increased demand and complexity of treatment. **Objective:** This report seeks to highlight the impacts of underfunding on clinical practice and the experience at the James Fanstone Foundation, highlighting initiatives that can contribute to strengthening the system and showing state and municipal investments as potential solutions to improve renal health care. **Methodology:** Experience report based on experiences during the Nephrology rotation at the James Fanstone Foundation in Anápolis and in the specialty's outpatient clinics, carried out during the Internal Medicine residency. **Results:** The diagnosis of Chronic Kidney Disease can be made based on routine exams in patients with chronic diseases such as diabetes and hypertension. Soon after, together with the nephrologist, the type of treatment, type of vascular access and request for a place in the municipal dialysis clinics are defined. However, the investment from the SUS table does not cover all the expenses generated by RRT. Currently, some Brazilian states assist with funds to supplement the financing of hemodialysis, which has brought great benefits to patients. **Conclusion:** It is necessary to increase investments in hemodialysis sessions and clinics in the country, with the objective of improving care for chronic kidney patients and increasing their quality and life expectancy.

Keywords: Chronic Kidney Disease. Hemodialysis. Underfunding. Renal Replacement Therapy.

INTRODUCTION

Chronic Kidney Disease (CKD) is defined as the progressive and irreversible loss of kidney function.[1] According to data published in 2023 by the Brazilian Society of Nephrology (SBN), CKD is considered endemic in the country, affecting 1 in 10 Brazilian adults. Furthermore, the data revealed that by 2022, there were over 150,000 patients undergoing dialysis treatment in Brazil, with more than 120,000 of them receiving hemodialysis sessions through the Unified Health System (SUS). Additionally, it was estimated that over 2,000 people were on waiting lists to begin

treatment in public clinics.[2]

However, the growing number of patients in these institutions and the lack of adjustments to the SUS reimbursement table for financing hemodialysis in Brazil have led to negative consequences in the care of dialysis-dependent chronic kidney disease patients. These include a shortage of clinic vacancies, a limited number of sessions, a lack of high-flux dialyzers, insufficient facilities for hemodialysis in patients with chronic viral infections, and difficulties in accessing high-cost medications that complement the treatment.

As a result, the maintenance of this service faces significant challenges due to the financing provided by the SUS reimbursement table. Consequently, some Brazilian states have implemented financial incentives to support the sector, aiming to improve patient care and reduce losses for local governments.

This experience report aims to highlight the clinical practice at the James Fantone Foundation's hemodialysis clinic and the nephrology outpatient clinic, as well as to describe the challenges faced by chronic kidney disease patients. Additionally, it seeks to shed light on public investment in this health sector, emphasizing the initiatives of some Brazilian states in addressing the underfunding of Renal Replacement Therapy (RRT) services and the benefits generated for users.

EXPERIENCE REPORT

The proposal for integrating hemodialysis clinics and nephrology outpatient care into the Internal Medicine residency program aims to provide exposure to the routine of Renal Replacement Therapy (RRT) and deepen knowledge about Chronic Kidney Disease (CKD). The prevalence of CKD has been rising in recent years due to the declining quality of life among many Brazilians and the lack of adherence to treatments for other comorbidities, such as hypertension, cardiovascular diseases, and diabetes—these being the primary causes of CKD in Brazil.[3]

Patients within this risk group require regular medical follow-ups. The diagnosis of Chronic Kidney Disease (CKD) requires a Glomerular Filtration Rate (GFR) of less than 60 ml/min/1.73 m^2 for more than three months, or a GFR greater than 60 ml/min/1.73 m^2 accompanied by albuminuria, glomerular-origin hematuria, electrolyte imbalances, tubular diseases, abnormal renal biopsy findings, structural abnormalities on imaging studies, or a history of kidney transplantation.

Once the diagnosis is established, the disease staging is performed based on the GFR, ranging from stages 1 to 5. Additionally, in patients with stages 4 and 5, an investigation of mineral bone disorder and anemia is conducted, along with screening for viral diseases such as hepatitis B, hepatitis C, and HIV.

In collaboration with the attending nephrologist, treatment strategies and pathways for Renal Replacement Therapy (RRT) are defined, including the Shilley catheter, arteriovenous fistulas (AVF), Permcath, and peritoneal dialysis. Following this process, a request is made to the municipal Health Department for a vacancy to perform dialysis.

Most of the patients at the clinic reported receiving their diagnosis during hospital admissions caused by clinical decompensation of CKD, such as hyperkalemia, uremia, and hypervolemia. Many had not managed their comorbidities properly, or had excessively used anti-inflammatory drugs or other nephrotoxic medications, leading to irreversible kidney damage. This reality

reflects the difficulty in accessing early diagnosis and follow-up, which could have been addressed through outpatient care. It highlights the lack of access to preventive care and early diagnostic services.

After the initiation of Renal Replacement Therapy (RRT), changes occur in the patient's routine, such as work hours, dietary and fluid restrictions, care with the fistula or catheter, and continuous medication use. Many highlight the discomfort of the puncture during each hemodialysis session and the prolonged duration of the sessions. Additionally, family members describe the challenges they face, such as the need for dietary restructuring, the availability of a companion during dialysis, the high cost of medications, and the difficulty of intermunicipal transportation. Many of these services are provided by the municipality of origin, as many patients live in cities near Anápolis.

At the James Fantone Foundation clinic, patients undergo 3 hemodialysis sessions per week, each lasting 3 to 4 hours. In Brazil, the Unified Health System (SUS) provides 3 hemodialysis sessions per week, while pediatric patients receive 4 sessions during the same period.[4]

The dialysis schedule varies based on the patient's dry weight and KTV, which is a ratio that assesses the quality of hemodialysis based on the clearance volume and the dialyzer's ability/performance in removing substances from the blood (K), the dialysis time (T), and the patient's body volume (V). The nephrologist is able to prescribe an efficient hemodialysis treatment suitable for the weight the patient has gained during the interdialytic period.[5]

Another treatment modality is peritoneal dialysis, which, according to the Brazilian Society of Nephrology (2021), occurs within the patient's body, with the peritoneum acting as a substitute for renal function. It is divided into two types: Continuous Ambulatory Peritoneal Dialysis (CAPD), which, according to the Brazilian Society of Nephrology (2021), is a daily manual procedure performed by the patient or a family member, with four exchanges per day. The other type is Automated Peritoneal Dialysis (APD), also performed daily, at night, using a cycler machine that infuses and drains the fluid, performing the necessary exchanges according to the doctor's prescription.[6,7]

According to Constitutional Amendment Proposal 32/2022, the Federal Government increased the SUS table value by 10.3%, raising the cost per session to R$ 240.97. Additionally, there was an additional incentive for the maintenance of hemodialysis machines in clinics with more than 29 units. As a result, an increase in dialysis vacancies in institutions across the country and a reduction in the number of patients on waiting lists for treatment were estimated. However, this was not enough to cover the expenses.

The discrepancy between the actual costs of a hemodialysis session and the amounts reimbursed by SUS is evident. According to a survey conducted by the Brazilian Association of Dialysis and Transplant Centers (ABCDT), the cost per session in March 2020 was R$ 301.34, and in March 2021, it was R$ 314.27. At the time, the reimbursement according to the SUS table between 2020 and 2021 was R$ 194.208. With this difference in values, clinics faced high costs for supplies, limited vacancies, and difficulties maintaining equipment, charges, and taxes.

At the end of 2019, the state of Rio de Janeiro, with the support of ABCDT, implemented co-financing for dialysis. Currently, the states of Mato Grosso do Sul, Rio de Janeiro, Distrito Federal, Bahia, Mato Grosso, Santa Catarina, Sergipe, São Paulo, and Amazonas provide financial assistance to complement dialysis funding. As a result, there are reports of an

increase in the number of vacancies, improvement in the technical capacity of clinics, and better care for patients.

In Santa Catarina, the State Health Department will allocate a monthly amount of R$ 1,235.00 per patient undergoing peritoneal dialysis to cover the cost of materials and the maintenance of the multidisciplinary team providing care. Additionally, R$ 61.00 will be allocated for hemodialysis sessions, based on the reference of Ordinance MS 389 of March 13, 2014, which encouraged funding for the care of patients with Chronic Kidney Disease (CKD), though it was later revoked.[9]

In contrast, only in 2023 was Ordinance No. 813/2023 established, initiating co-financing for Renal Replacement Therapy in the state of São Paulo. As a result, the additional amount to be paid by the state is R$ 700.00 per month for each patient undergoing hemodialysis, R$1,300.00 per patient undergoing ambulatory peritoneal dialysis, and R$ 600.00 for the creation of arteriovenous fistulas.[10]

In Mato Grosso do Sul, Resolution No. 161/SES/MS of 2024 authorized financing for Renal Replacement Therapy services with an amount of R$ 45.00 per hemodialysis session, with a maximum of 14 dialysis sessions per patient per month.[11]

State co-financing has proven to be an effective strategy in some Brazilian states, enabling the expansion of available spots and improvement in service quality. However, these initiatives are still isolated and require broader national adoption to ensure the sustainability of the hemodialysis system.

CONCLUSIONS

During the two months at the hemodialysis clinic of Fundação James Fanstone in Anápolis and in the nephrology outpatient clinics, it was possible to experience the routine of dialysis patients and their families, listen to their experiences with the disease, and understand the impacts on their lives. This highlights the importance of comprehensive and humanized care, which should go beyond the technical approach and also consider the social and emotional implications of the disease.

Moreover, other points to highlight are the lack of available spots in clinics for all patients in the network and the long wait for the creation of arteriovenous fistulas through the Unified Health System (SUS).

Based on studies and research conducted by the SBN and ABCDT, it has been proven that the SUS reimbursement for hemodialysis sessions in Brazil is insufficient to cover the payment of staff, supplies, and expenses generated by each dialysis patient. With the existing state co-financing in the states of Mato Grosso do Sul, Rio de Janeiro, Federal District, Bahia, Mato Grosso, Santa Catarina, Sergipe, São Paulo, and Amazonas, improvements in patient care and quality of life for those with chronic kidney disease have been observed, along with a reduction in waiting lists for clinic vacancies.

Therefore, strengthening public financing and expanding state co-financing programs are essential measures to ensure universal and equitable access to dialysis treatment. Based on the clinical experience, the need for public policies that promote the financial sustainability of clinics and improve the quality of life of chronic kidney disease patients, in all their biopsychosocial dimensions, is emphasized.

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MEDICAL RESIDENCY MODELS

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In medical residency models, there are basically two approaches: the first is called the temporal model, and the second is known as the staged model (EPAS').

The first approach, the temporal model, is based on a fixed timeline: after passing the selection process, the medical resident follows a predetermined duration to complete the program. If the program is three years long, they complete those three years, neither finishing earlier nor later. There is no variation in key stages that certify them as specialists. At the end of those three years, regardless of whether they performed more, fewer, or even no procedures in their field of study, they graduate with a specialist title issued by the Ministry of Education and Culture and endorsed by the local Medical Council, with final approval by the Federal Medical Council. They are then released into the population to practice as specialists. This model is a failed one because it lacks control over the essential stages required for true specialization. For example, if a gynecology program defines that a gynecologist must perform at least fifty hysterectomies to be deemed competent in gynecologic surgery, under the temporal model in Brazil, a resident who performs just one, fifty, or even two hundred hysterectomies graduates as a specialist. The completion of the necessary steps to achieve expertise in that area is not required. This is the model used in Brazil and throughout Latin America.

The complication with this model is that, as a general rule, medical residents complete their three years—or more or less, depending on the program—based solely on time, and nearly 100% of them are approved. Removal from the program or transferring a resident to an area where they might be better suited does not occur. Therefore, this is a model that urgently needs reform, as it is detrimental to the Brazilian population.

The second model, known as the staged model (EPAS), is based on tested competencies. Each program establishes specific requirements that the medical resident must meet. For instance, if a resident does not complete the required fifty hysterectomies, they cannot progress to the next stage. This model is superior for several reasons. First, it ensures that residents are not stuck in areas where they lack aptitude. Surgeons are surgeons, and clinicians are clinicians. It allows for the transfer from one area to another. For example, if a resident aspires to be a surgeon but lacks the necessary skills, they can transition to a clinical area, and vice versa.

If, after three years, the resident has not completed the required stages for their chosen specialty, they do not graduate or receive their title. This model emphasizes clear and defined

competency, requiring the completion of all outlined stages. The EPAS model, practiced by the Royal College in Canada, does not have a fixed timeline for residency completion. A resident may finish in three, four, five, or even ten years, but only upon fulfilling all pre-established requirements. This approach is superior because it ensures that what is promised in the program's documentation is delivered to the public: a true specialist. Consequently, the population can trust the certification issued by the Ministry of Education and Culture (MEC) and the endorsement of the Federal Medical Council. Unfortunately, under the current system, this trust is not justified.

Therefore, the Federal Council of Medicine must look a little more into this, and in our view, we must transport and defend the model in stages and abandon the temporal model, because this model is not the right one for the population.

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