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Scientific Journal of the Paraguayan Society of Surgery (SOPACI)

CONTENT

EDITORIAL

Doi: 10.18004/sopaci.2023.agosto.7

Artificial intelligence in medical science

La inteligencia artificial en la ciencia médica

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In 1996, IBM developed Deep Blue, a supercomputer designed solely for playing chess, to challenge the reigning champion of the 1980s, 90s, and early 2000s, Gary Kasparov. Deep Blue was capable of calculating between 50-100 million moves per second. In addition to its computational power, engineers had loaded an algorithm with several thousand of the best chess games for Deep Blue to utilize. However, despite this brute computational force and its algorithmic assistance, Kasparov won the series of matches. [1-2]

Following this event, a new version called Deeper Blue was developed, with doubled processing capacity and modifications to the algorithm. This supercomputer defeated to Kasparov in 1997, though questions remained about human involvement in the decision-making of some of Deeper Blue's moves. [1-2]

Deep Blue was created to defeat a world chess champion, whereas Deeper Blue was specifically designed to beat Gary Kasparov. Kasparov was in excellent form, and his moves likely could have defeated any other human player. However, Deep Blue did not resign, nor tire after hours of play, and was not influenced by psychological factors. It was a historic milestone where a machine triumphed over a human. This, along with other examples from previous decades, reflects the development of what came to be called artificial intelligence.

Artificial intelligence involves the creation of computer systems capable of performing cognitive functions or tasks that require human intelligence, such as problem-solving, visual perception, speech recognition, decision-making, and translation. [3]

Machine learning refers to the computer's ability to learn without being explicitly programmed, achieved through the study and construction of algorithms that learn from data and make predictions. Examples in our everyday lives include email filtering, facial recognition (in smartphones or social media), optical character recognition, among others. [3]

Deep learning is a modification of machine learning that attempts to mimic human learning. While machine learning algorithms use decision trees (linear processing, generating new data from existing ones like branches on a tree), deep learning forms interconnections between all datas, resembling artificial neural networks (non-linear, multi-layered, and unsupervised processing). [3]

All of this has led to diverse and highly capable computer systems. In the medical field, some deep learning-based systems achieve diagnoses and patient prognoses that are equal to or better than those of human professionals. [4]

Another application, not strictly medical but highly controversial, is ChatGPT, a chatbot developed by OpenAI released to the public in November 2022. It can generate text of nearly human quality on a wide range of topics and languages. Notably, a recent study by Ayers et al. found that the responses provided by ChatGPT in a medical forum responses were rated of significantly higher quality, longer, and more empathetic than those given by doctors. [5]

Due to its text generation capabilities, several scientific papers have referenced ChatGPT as a co-author, sparking debate within the international scientific community about whether this is acceptable. [6] Following intense debate among journal editors, several of these have decided

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to ban ChatGPT as a co-author.

This has prompted an update in the recommendations of the International Committee of Medical Journal Editors, stating: "Chatbots (such as ChatGPT) should not be listed as authors because they cannot be responsible for the accuracy, integrity, and originality of the work, and these responsibilities are required for authorship (see Section II.A.1)".[7]

Artificial intelligence is already a part of our daily lives, and also in our professional practice. It offers advantages such as rapid data processing and analysis but can contain interpretation errors within a context. They can be used under medical supervision, as the decision-making and responsibility for the decisions will remain human.

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Characterization of parotid tumor surgeries and pathological findings at the IPS Central Hospital in the period 2016-2020

Caracterización de las cirugías de tumor de parótida y hallazgos anatomopatológicos en el Hospital Central del IPS en el periodo 2016-2020

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SUMMARY

Introduction: Parotid tumors are considered a relatively rare pathology, constituting a group of tumors that affect the head and neck. Within the tumor pathology of the salivary glands, they constitute 80%, and 3% of all head and neck tumors. Of these, 80% correspond to benign tumors. The objective is to characterize parotid tumor surgeries and pathological findings at the IPS Central Hospital in the period 2016-2020. **Methodology**: Observational, descriptive and retrospective study of the database, with clinical records of patients with a history of surgery for parotid tumor at the Central Hospital of the IPS in the period 2016-2020. **Results**: A total of 44 parotid surgeries were analyzed. There was no predominance of sex. Patients from 51 to 60 years were the most affected. Pleomorphic adenoma was the most common benign tumor, followed by Warthin's tumor. Among malignant tumors, different types of carcinomas accounted for 9% of cases. **Conclusion**: The epidemiological, demographic and histological characteristics were representative of what is described in the literature, not finding major discrepancies within the national and international literature.

Keywords: parotid tumor, parotidectomy, general surgery

RESUMEN

Introducción: Los tumores parotídeos son considerados una patología relativamente rara, constituyendo un grupo de tumores que afectan a la cabeza y el cuello. Dentro de la patología tumorales de las glándulas salivales, constituyen un 80%, y el 3% de todos los tumores de cabeza y cuello. De estos, un 80% corresponde a tumores benignos. Como objetivo es caracterizar las cirugías de tumor de parótida y hallazgos anatomopatólogicos en el Hospital Central del IPS en el periodo 2016-2020. **Metodología**: Estudio observacional, descriptivo y retrospectivo de la base de datos, con fichas clínicas de pacientes con antecedente de cirugía por tumor de parótida en el Hospital Central del IPS en el periodo 2016-2020. **Resultados**: Fueron analizadas un total de 44 cirugías de parótida. No hubo predominio de sexo. Los pacientes de 51 a 60 años fueron los más afectados. El adenoma pleomórfico fue el tumor benigno más frecuente, seguido del tumor de Warthin. Entre los tumores malignos, distintos tipos de carcinomas representaron el 9% de los casos. **Conclusión**: Las características epidemiológicas, demográficas e histológicas fueron representativas de lo descripto en la literatura, no encontrándose mayores discrepancias dentro de la literatura nacional e internacional.

Palabras claves: tumor de parótida, parotidectomía, cirugía general

INTRODUCTION

Parotid tumors are considered a relatively rare pathology, comprising a diverse group of tumors that affect the head and neck. Within salivary gland pathology, they constitute 80%, and 3% of all head and neck tumors. Of these, 80% are benign tumors. [1–3]

These tumors are characterized by a wide diversity in their pathological characteristics; the pathological classification of these tumors by the World Health Organization describes nearly 10 different forms of adenomas, with pleomorphic adenoma and Warthin's tumor predominating, but also around twenty types of carcinomas, non-epithelial tumors, lymphomas, and secondary tumors. The clinical presentation varies depending on the type of tumor, particularly based on its benign or malignant nature. [4,5]

Pleomorphic adenoma is the most common benign tumor of the salivary glands, accounting for approximately 60% of all salivary neoplasms. It is mainly composed of a proliferation of myoepithelial cells and a wide range of components of epithelial

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and mesenchymal tissue, surrounded by a clear fibrous capsule. Around 80% of pleomorphic adenomas occur in the parotid gland, 10% in the submandibular gland, and 10% in the minor salivary glands of the oral cavity. The average age of presentation is 46 years, with a range spanning from the third to fifth decades of life. However, it has been found in individuals of all ages, with a slight predilection for females. [6,7]

Warthin's tumor is the second most common benign neoplasm of the salivary glands. It is mainly located in the parotid gland, accounting for 6-10% of all parotid tumors. It occurs in older men, but the incidence in women has been increasing, possibly related to increased smoking in this group. [3] As for oncocytoma, it is nearly exclusive to the parotid gland and represents less than 1% of all parotid tumors. Malignant degeneration is a rare possibility, possibly explained by an acquired genetic defect causing mitochondrial dysfunction. [3,8]

Mucoepidermoid carcinoma is the most common malignant neoplasm in both major and minor salivary glands, accounting for almost 30% of all malignant salivary gland neoplasms. [9,10] Approximately half of mucoepidermoid carcinomas occur in the major salivary glands, with 80% in the parotid gland, 8 to 13% in the submandibular gland, and 2 to 4% in the sublingual gland. The time of presentation occurs between the second and eighth decades of life, and it is the most frequent malignant tumor in individuals under 20 years of age, with a predilection for the hard palate. There is also a clear preference for the white race. [9]

Malignant transformation of a mixed tumor occurs about 10 to 20 years later than the benign form and is suspected based on signs and symptoms suggestive of malignancy, as previously mentioned (facial paralysis, rapid growth, pain, adherence to planes, etc.).

Adenocarcinoma accounts for about 4% of tumors. Overall, they have a strong tendency to metastasize (50% lymphatic and 30% hematogenous). There are three fundamental types: mucinous (lower survival compared to other subtypes: 30% at 20 years), salivary ductal (elderly males), and intercalated ductal (elderly, high 10-year survival).

Metastases to salivary glands can occur via lymphatic, hematogenous, or contiguous spread (more common in soft tissue sarcomas, bone tumors, and skin tumors). The most common histological types of lymphatic spread are cutaneous squamous cell carcinoma and melanoma, while the most common origin in hematogenous spread is the lung. [2]

Parotid tumors typically present as progressive volume enlargement localized to this region. Facial motility alteration due to facial nerve involvement, regional pain, and/or regional lymphadenopathy are suggestive findings of malignancy. Currently, in head and neck oncology, the diagnosis and treatment of these tumors remain a challenge. [7]

The main complementary investigations include magnetic resonance imaging and fine-needle aspiration, often guided by ultrasound. Computed tomography does not play a prominent role in the evaluation of these parotid tumors. The treatment of benign parotid gland tumors is based on surgery, with the type of resection being debated in the literature and varying between wide excision techniques, such as total parotidectomy with preservation of the facial nerve, and more or less limited procedures, such as extracapsular dissection. The treatment of malignant tumors is based on surgery and radiation therapy, with indications being based on tumor stage. [4]

This study aims to characterize the diagnoses and surgeries performed in patients with parotid tumors at the Central Hospital of the Instituto de Previsión Social (HC-IPS).

MATERIALS AND METHODS

The study conducted is observational, descriptive, and retrospective in nature, involving patients with a history of parotid tumor surgery at the HC-IPS in the period 2016-2020.

During data collection, operative records and biopsy reports of the studied patients were used. Patients whose operative records were incomplete or whose pathology results were unavailable in the computerized system were excluded. The database was stored from January 2016 to December 2020 in an Excel file, considering following variables: age, gender, operative findings, surgical site, procedure performed, and anatomopathological diagnosis.

After obtaining approval for the research protocol and authorization to access the Hospital Information System (SIH) database, the data were stored in an Excel template file from January 2016 to December 2020, following the inclusion and exclusion criteria mentioned above. Descriptive statistics were employed, including summary measures according to distribution, frequency table, and pie and bar charts. The data were collected, described, and tabulated in a Microsoft Office Excel spreadsheet.

RESULTS

A total of 44 parotid surgeries were analyzed during the period 2016-2020. The variables used for the study included age, sex, type of surgery performed, side, and histopathological diagnosis. The distribution according to sex was 50% for both female and male patients, respectively.

In terms of the age group of the operated patients, 22% corresponded to patients aged 51-60 years, 18% to those aged 41-50 years, 18% to those aged 61-70 years, 16% to those aged 71-80 years, 11% to those aged 31-40 years, 9% to those aged 21-30 years, 2% to those aged 81-90 years, and 2% to those over 90 years. ***(Graph 1)***

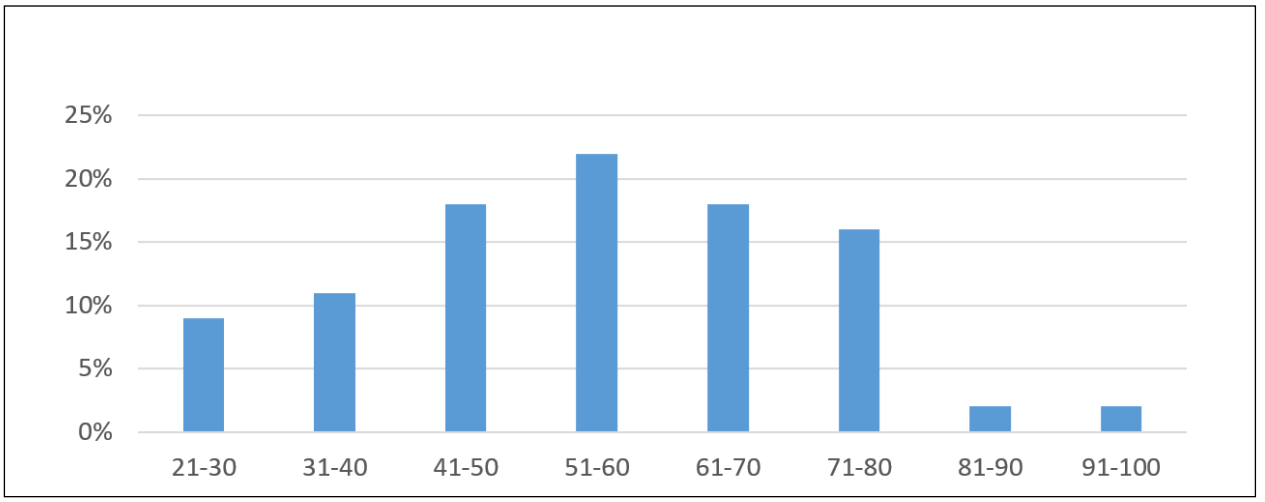
Regarding the anatomical location, the left side was predominant over the right side, accounting for 52% and 48% respectively.

In terms of the type of operation performed, 64% underwent superficial parotidectomy, 22% excisional biopsy, 9% partial parotidectomy, and 4.5% underwent incisional biopsy. ***(Graph 2)***

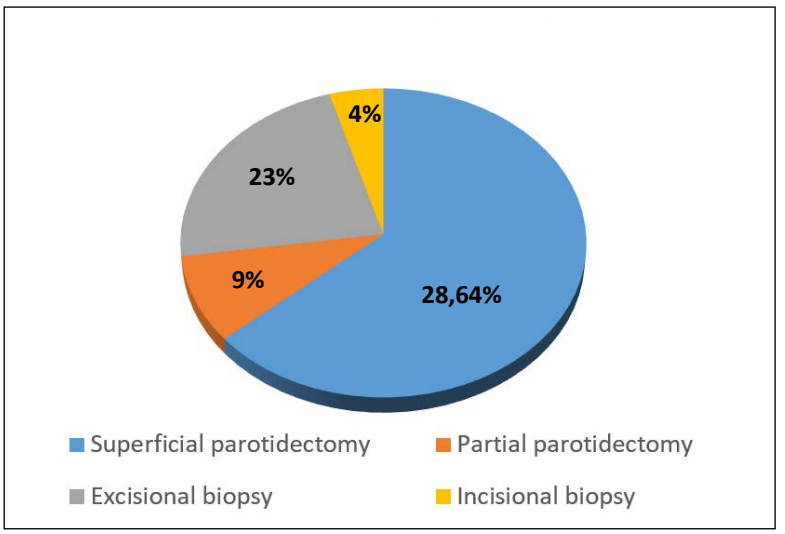
Regarding the histopathological findings, the majority were pleomorphic adenomas (50%), followed by Warthin's tumors (9%), oncocytomas (4.54%), myoepithelial carcinomas (2.27%), mucoepidermoid carcinomas (2.27%), basal cell adenomas (2.27%), squamous cell carcinomas (2.27%), acinar cell carcinomas (2.27%), adenomyoepitheliomas (2.27%), in 13.6% of the analyzed samples, secondary tumors were found as a result of other primary entities, such as squamous cell carcinomas of the skin, and in 9.1% of cases, other types of findings were present (lipomas, lymphoepithelial cysts). ***(Graph 3)***

DISCUSSION

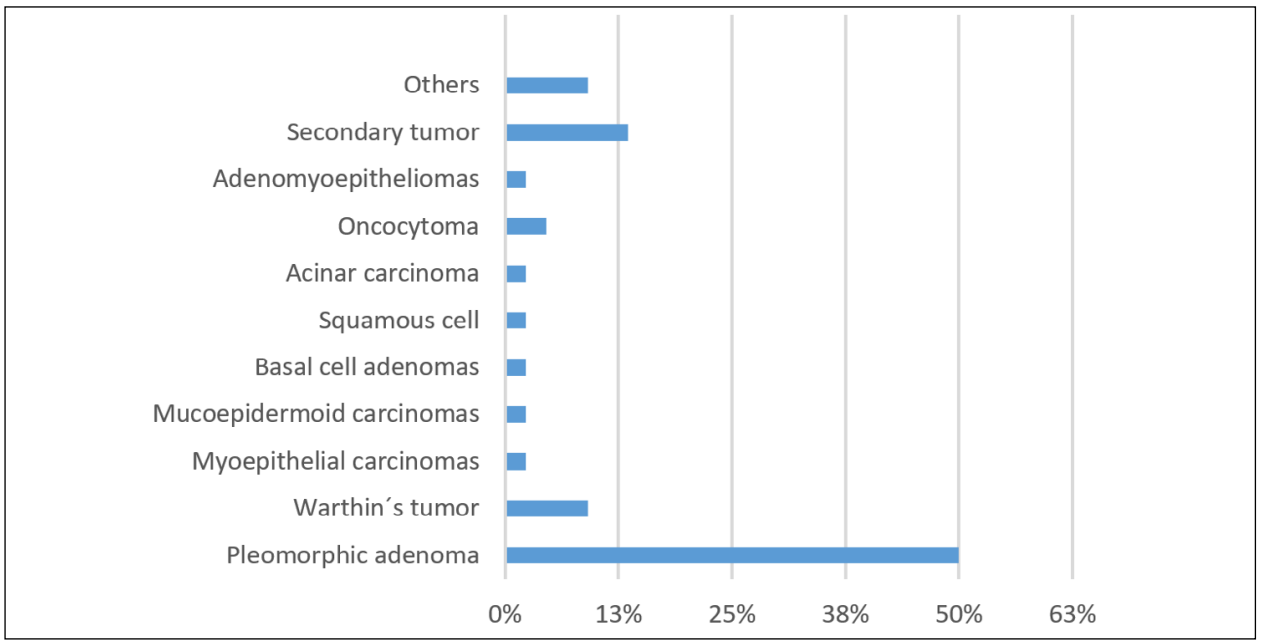
There is a wide variety of diseases related to head and neck tumors, among them, tumors of the parotid gland constitute the majority of this group. Approximately 80% of parotid gland tumors are benign. [13] Among the most frequent are pleomorphic adenomas and Warthin's tumors, accounting for 50% and 10% of all parotid tumors, respectively. In our series, the incidence of benign tumors was 79.4% (27 cases), including only primary parotid tumors. Of these, 64% (22 cases) were pleomorphic adenomas, 11.7% (4 cases) were Warthin's tumors, and 2.9% (one case) were basal cell adenomas, which aligns with reports in the litera-



Graph 1. Age group of patients undergoing parotid surgery



Graph 2. Types of surgeries performed



Graph 3. Histopathological findings

ture. [1,11–13] Primary malignant tumors of the parotid accounted for 20% (7 cases) in this series, slightly lower than reported in the literature. This lower rate could be due to the exclusion of tumors secondary to other organs, which accounted for 13% (6 cases) of the studied specimens.

In the international literature, Lin et al. [1] described a similar percentage to the one mentioned above, with a benignity rate of 85%, with the most common finding being pleomorphic adenomas in 51% of the examined samples. Regarding malignant tumors, mucoepidermoid carcinoma was the most common with an incidence of 3%.

Tapia C et al. [6] found results with similar characteristics. Out of 70 parotid tumors, 84.3% were benign tumors and 15.7% were malignant tumors. Among benign tumors, 76.3% were pleomorphic adenomas and 6.7% were Warthin's tumors. Among other malignant tumors, some corresponded to myoepithelial carcinoma, mucoepidermoid carcinoma, adenoid cystic carcinoma, acinar cell carcinomas, and non-Hodgkin lymphoma.

It's important to consider sociodemographic factors, as concluded by Rocha R et al. [12], who described that more than half of the cases are diagnosed at advanced stages due to the rural origin of a large part of the affected population, and in which the age group 45-64 (53.8%) predominated. These individuals belong to the economically and socially more active age group. They also found that the most accepted etiological factor was occupational risks and exposure to radioactive sources.

Regarding the age of presentation, what is reported in the literature is consistent with our series, both for male and female patients. [5,11] The incidence in women was higher for both pleomorphic adenomas and Warthin's tumors. Seven male patients presented malignant tumors, and four female patients presented malignant tumors. It's noteworthy that the diagnosis of mucoepidermoid carcinoma was made in a male patient and lymphoma in a female patient.

CONCLUSION

Parotid tumors constitute a group with diverse etiology, with a high proportion of benign pathology. No gender difference was found in the incidence, and the age range with the highest occurrence was the sixth decade of life.

The most performed surgery was superficial parotidectomy, and the most frequent pathological finding was pleomorphic adenoma.

Conflict of Interest: The authors declare no conflict of interest.

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ESWEP score global aplication: a retrospective study

ESWEP score, aplicación global: un estudio retrospectivo

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SUMMARY

Introduction: In 2021, the ESWEP Score was developed, a tool that considers variables to decide between primary closure or ostomy in enteric perforation, the cut-off point was 11, no traumatic perforation was considered. Validating ESWEP Score, in all segments of the digestive tract, and patients with traumatic perforation, would allow providing optimal treatment. **Materials and methods:** Retrospective study, through anesthesiology service records, included 49 with traumatic and non-traumatic gastrointestinal perforation in whom primary closure was performed between years 2020-2022. Statistical analysis was performed in SPSS 28.0 .1. **Results:** 49 patients were included with a mean score of 9.06 SD 3.243, 41 cases (83.7%) with a score less than or equal to 11, only 8 cases with score >11, 65.3% were perforations of traumatic origin, only 10.2% of cases presented dehiscence with a mean score of 14.4 SD 2.8. Fisher's exact test rejected independence between ESWEP Score and dehiscence, with p=0.001, no association between other variables was confirmed. The association between the cut-off point established by Ammar & Cols. with primary closure dehiscence. **Conclusion:** ESWEP Score is a useful tool for surgical decision making in patients with traumatic and non-traumatic gastrointestinal perforation.

Key words: Perforation, Trauma, Dehiscense, Gastrointestinal Anastomosis

RESUMEN

Introducción: En 2021 fue desarrollado ESWEP Score, una herramienta que considera variables para decidir entre cierre primario u ostomía en perforación entérica, el punto de corte fue 11, no se contempló perforación traumática. Validar ESWEP Score, en todos los segmentos del tracto digestivo, y pacientes con perforación traumática, permitiría proveer tratamiento óptimo. **Materiales y métodos:** Estudio retrospectivo, a través de registros del servicio de anestesiología, se incluyeron 49 con perforación gastrointestinal traumática y no traumática en quienes se realizó cierre primario, entre 2020-2022. Se efectuó el análisis estadístico en SPSS 28.0.1. **Resultados:** Se incluyen 49 pacientes con media de puntaje 9,06 DE 3,243, 41 pacientes (83,7%) con puntaje menor o igual a 11, 8 de los casos (16,3%) con score >11, 65,3% fueron perforaciones de origen traumático, sólo se presentó dehiscencia 10.2% de casos con media de puntaje fue 14,4 DE 2,8. La prueba exacta de Fisher rechazó independencia entre ESWEP Score y dehiscencia, con p=0,001, no se corroboró asociación entre otras variables. Se confirma la asociación entre el punto corte que establecieron Ammar & Cols. con la dehiscencia de cierre primario. **Conclusión:** ESWEP Score resulta una herramienta útil para la toma de decisiones quirúrgicas en pacientes con perforación gastrointestinal traumática y no traumática.

Palabas clave: Perforación, Traumatismo, Dehiscencia, Anastomosis Gastrointestinal

INTRODUCTION

Enteric perforation constitutes a surgical emergency with a high mortality rate, which has been documented to be as high as 30-50%.[1] Delayed diagnosis and treatment lead to a state of sepsis. The latter represents a public health issue, as it is estimated to affect millions of individuals annually, contributing to a mortality rate of 1:3 of those affected.[2]

Currently, there are patient-dependent variables that modify the prognosis in relation to the provided treatment, leading to an increased likelihood of primary closure technique dehiscence. Studies have identified individual pathologies that generate states of immunosuppression, delaying the healing process. When combined with other factors, attempts have been made to establish tools that can predict anastomotic leakage.[3] Other research has focused on describing treatment outcomes, considering a single segment of the digestive tract, and in surgical procedures that are not performed as emergencies.[4]

In 2021, a tool called the ESWEP Score was validated. ***(Figure 1)*** Its acronym stands for East Surgical Ward Enteric Perforation Score. This scale assigns scores to various preoperative and intraoperative variables, with a total of 26 factors.

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Figure 1. ESWEP Score, validated by Ammar & Colaboradores, 2021. [5]

PRE-OPERATIVE SCORE		
Parametes	*Value*	Score
1.-Age	More than 50 years	1
2.-Pre-operative vitals	Pulse >100 beats/minute	1
	MAP <80mmHg	1
	RR >30/minute	1
	Respiratory alkalosis/acidosis	1
3.-Laboratory investigations	Hb <8 g/dl	1
	TLC >12 x 10^9 / L	1
	Serum albumin < 3g/dL	1
	Serum creatinine >1mg/dL	1
4.-Urine output	>0.5ml/kg/hour	1
5.-Immunocompromised status	Diabetic	1
	HIV/Hepatitis B/Hepatitis C	1
	Cardiac disease	1
6.-Duration of symptoms	More than 48 hours	1
PER-OPERATIVE SCORE		
Parametes	*Value*	Score
1.-Perforation size	>1 cm	1
2.-No of perforations	>1	1
3.-Peritoneal spillage	<500cc	1
500-1000cc	2	
>1000cc	3	
4.-Anesthesia duration	<1 hour	1
	>1 hour	1
5.-Por.operative vitals	Pulse >100beats/min	1
	MAP <80mmHg	1
6.-Per-operative urine output	<0.5ml/kg/hour	1
7.-Condition of small gut	Inflamed/diseased	1
8.-Length of segmented involved	More than half feet	1

Obs.: Total pre-operative score: 14. Total per-operative score: 12. Total ESWEP Score: 26
MAP: mean arterial pressure, RR: respiratory rate, Hb: hemoglobin, TLC: total leukocyte count, HIV: human immunodeficiency virus.

A higher score is associated with more unfavorable factors for successful primary closure. The cutoff point indicated in this study for the decision between primary closure techniques or the creation of a stoma was 11. One of the circumstances noted in the study is that the surgeon's experience still determines the surgical decision.[5] This score was developed in a population with non-traumatic enteric perforation. Therefore, this study aims to evaluate the use of this tool in a more diverse population, considering each segment of the digestive tract and including patients whose perforation is due to trauma.

Individuals with enteric perforation require emergency surgical treatment. While the initial goal is to control contamination to prevent progression to sepsis, once the site is identified, definitive management is necessary. Therapeutic options include primary closure techniques without resection and anastomosis, primary closures involving resection and anastomosis, as well as stomas.[6] Although intestinal diversion eliminates the possibility of primary closure dehiscence, it is not a complication-free treatment and negatively impacts the patient's quality of life.[7] Considering the above, some authors suggest that primary closure techniques can be performed in up to 90% of perforations resulting from abdominal trauma.[8]

It is necessary to provide the treatment that results in the lowest number of short and long-term complications, reduces the risk of surgical reintervention. Decision-making to achieve these objectives must be multifactorial and individualized, considering factors associated with etiology, duration of symptoms, patient's clinical condition, laboratory parameters, resource availability. All these variables are considered in the ESWEP Score, except for the last one, which is also a subject of study when evaluating the association between primary closure dehiscence and the use of suture materials. The ESWEP Score seems to be a comprehensive tool that can meet the need for a resource to define appropriate treatment for gastrointestinal perforations.

MATERIALS AND METHODS

A cross-sectional descriptive study was conducted using a retrospective sample of patients from the General Hospital of the State of Sonora over a two-year period between 2020 and 2022.

Data were collected from surgical procedure records in the anesthesiology department. Inclusion criteria consisted of patients with gastrointestinal perforation who underwent primary closure techniques and had available clinical and laboratory parameter records to establish the ESWEP Score. Exclusion criteria involved patients with insufficient information to determine the score and those for whom the evaluation of surgical treatment outcomes was not possible due to various reasons, including death, voluntary discharge, or transfer.

Data were collected on the variables ESWEP Score (considering a cutoff point of 11), type of perforation (traumatic and non-traumatic), primary closure dehiscence, complications, re-intervention, and suture material used. Once included in the database, IBM SPSS 28.0 software was utilized, employing the Fisher's exact test to determine the association between ESWEP Score (above or below 11) and primary closure dehiscence, with a p-value of <0.05 considered statistically significant.

RESULTS

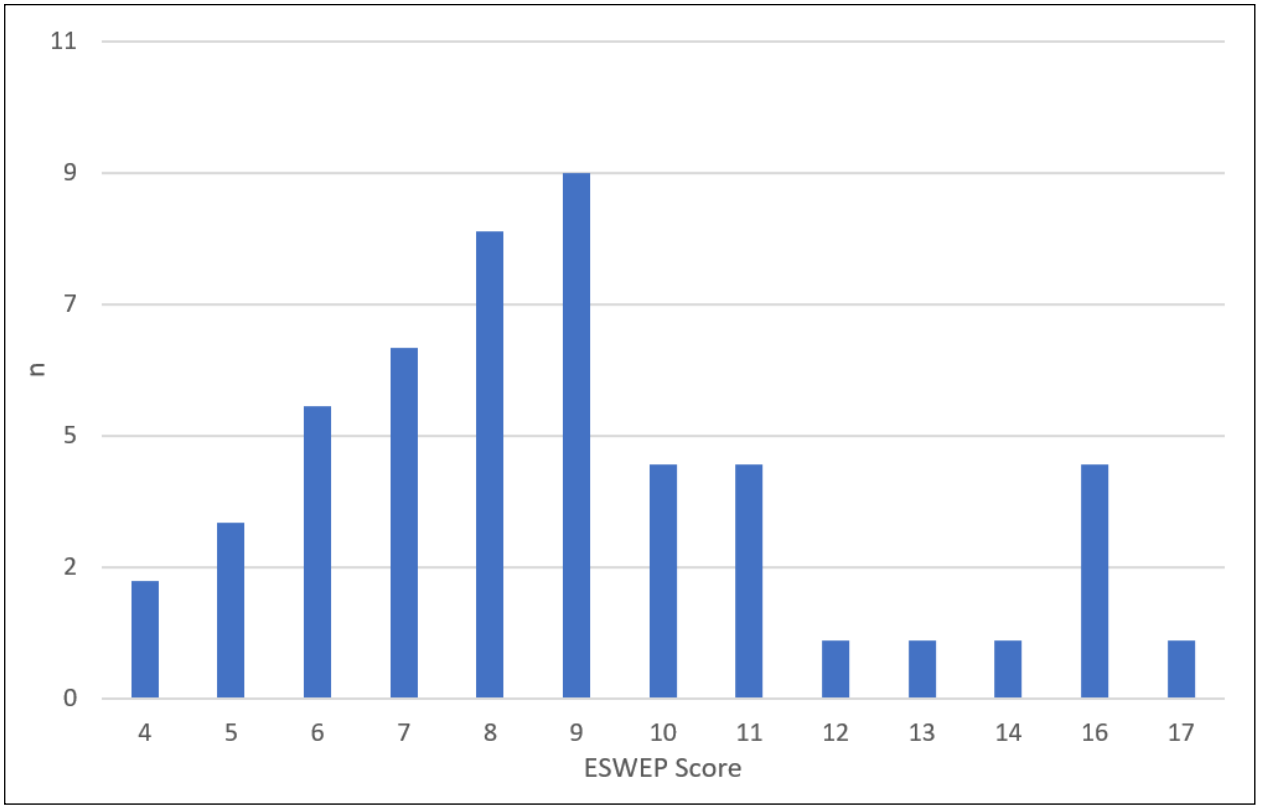
The surgical procedure logs from the anesthesiology department of the General Hospital of the State of Sonora were reviewed for the period 2020-2022. Among them, 49 patients with gastrointestinal perforation who underwent primary closure techniques were identified. Both physical and electronic medical records contained information necessary to establish the ESWEP Score for all patients, except for albumin. Twenty-eight patients had recorded serum albumin levels, representing 57%, while 21 patients had no albumin record (43%). Serum albumin is not considered a supplementary study for trauma patients. Therefore, we decided not to exclude these patients and chose to compare the results between the entire group and those with available albumin levels.

Once the scores were established, the minimum score observed was 4, and the maximum was 17. The most frequently observed score was 9, recorded in 9 different patients, representing 18.4% of the total cases ***(Figure 1)***. Considering the cutoff point defined by Ammar & Colleagues for the ESWEP Score, the sample was divided into two groups. A total of 41 patients had a score equal to or less than 11 (83.7%), while only 8 patients had an ESWEP Score greater than 11 (16.3%).

The mean ESWEP Score obtained was 9.06, with a standard deviation (SD) of 3.243, estimated from the population of 49 patients. In the group of 28 patients with available albumin levels, the mean was 9.93 with an SD of 3.506. For patients without albumin data, the calculated mean was 7.9 with an SD of 2.4.

Regarding the diagnosis, a total of 14 diagnoses were reported. ***(Table 1)*** The most frequently reported diagnosis overall was traumatic small intestine perforation, occurring 18 times, which accounts for 36.7% of cases. Among the non-traumatic causes of perforation, peptic ulcer perforation was reported most frequently, occurring 10 times, representing 20.4% of the total. Seventeen cases of non-traumatic origin perforation were identified (34.7%), while 32 cases were of traumatic origin (65.3%).

Out of the 49 evaluated cases, only 5 patients (10.2%) experienced primary closure dehiscence. Regarding complications that occurred and required re-intervention, in addition to the 5 patients with documented primary closure dehiscence, there was one case of abdominal wall closure dehiscence and one case of intra-abdominal infection, totaling 7 patients who underwent re-intervention due to complications (14.3%). Characterizing the patients with complications and establishing risk factors for them is limited as they only accounted for 4% of the cases. In terms of the techniques employed, we documented simple primary closure and resection with anastomosis. Simple primary



Graph 1. Histogram of ESWEP Score scores.

Table 1. Frequency of diagnoses included in the study.

Diagnosis	n	%
Strangulated inguinal hernia with small bowel perforation	1	2,0%
Strangulated ventral hernia complicated by small bowel perforation	2	4,1%
Meckel's diverticulum perforation	1	2,0%
Peptic ulcer perforation	10	20,4%
Traumatic cecal perforation	1	2,0%
Traumatic colon perforation	5	10,2%
Traumatic stomach perforation	2	4,1%
Traumatic stomach and small bowel perforation	1	2,0%
Traumatic stomach and colon perforation	1	2,0%
Traumatic small bowel perforation	18	36,7%
Traumatic small bowel and colon perforation	3	6,1%
Unspecified small bowel perforation	1	2,0%
Intestinal tuberculosis	2	4,1%
Sigmoid volvulus	1	2,0%

closure was performed in 31 patients (63.3%), while resection and anastomosis were done in 18 patients (37.7%).

Six different types of suture materials were used. ***(Table 2)*** The most frequently used suture material was 3-0 Vicryl, employed in 28 cases (57.1%), while the least used material was 2-0 Silk, which was only used once (2%).

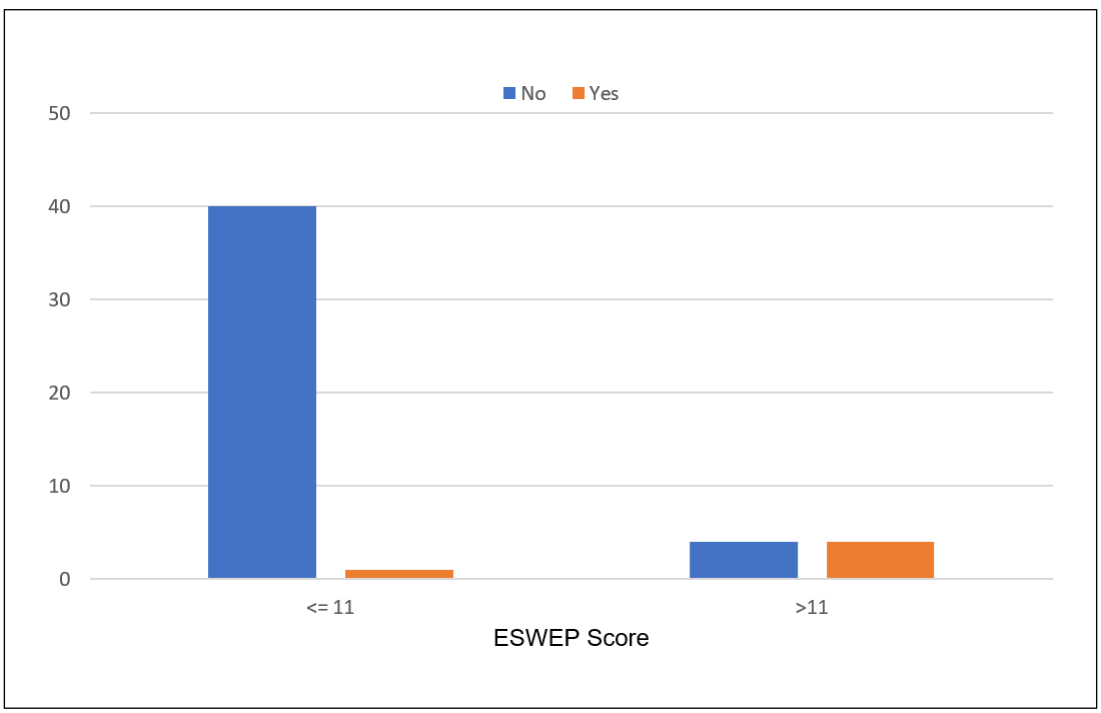
The same statistical analysis was conducted exclusively in the group of patients for whom preoperative serum albumin levels were documented. ***(Table 4 and Figure 3)*** Using the Fisher's exact test, independence between the variables was rejected with a statistical significance of p=0.008. Other statistical tests were employed to determine the strength of association (Phi and Kramer V), and consistent data were reported, yielding a value of 0.008.

Table 2. Frequency of primary closure materials used.

Material de sutura	n	%
Monocryl 3-0	10	20,4%
PDS 3-0	5	10,2%
Prolene 3-0	2	4,1%
Silk 2-0	1	2,0%
Vycril 2-0	3	6,1%
Vycril 3-0	28	57,1%

Table 3. Contingency table; dehiscence with respect to ESWEP Score cutoff, in the total cases studied.

		Dehiscence		Total
		No	Yes	
ESWEP Score	<= 11	40	1	**41**
	> 11	4	4	**8**
Total		**44**	**5**	**49**



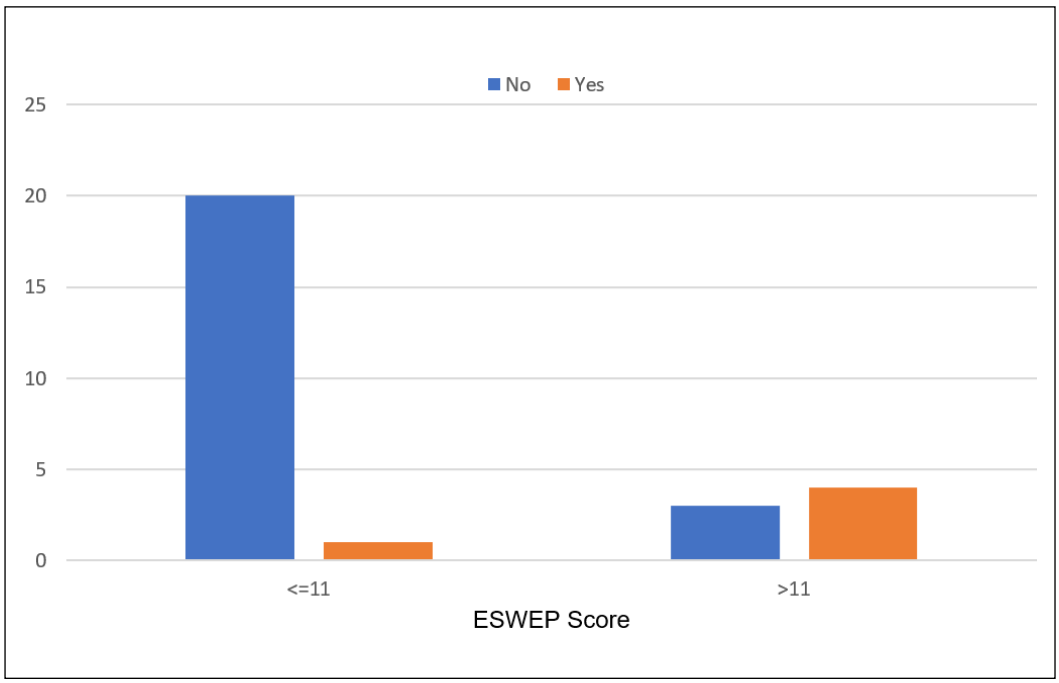
Graph 2. Cases of dehiscence by ESWEP Score cutoff in the total cases studied.

Table 4. Contingency table; dehiscence cases with respect to ESWEP Score cutoff in patients with serum albumin measurement

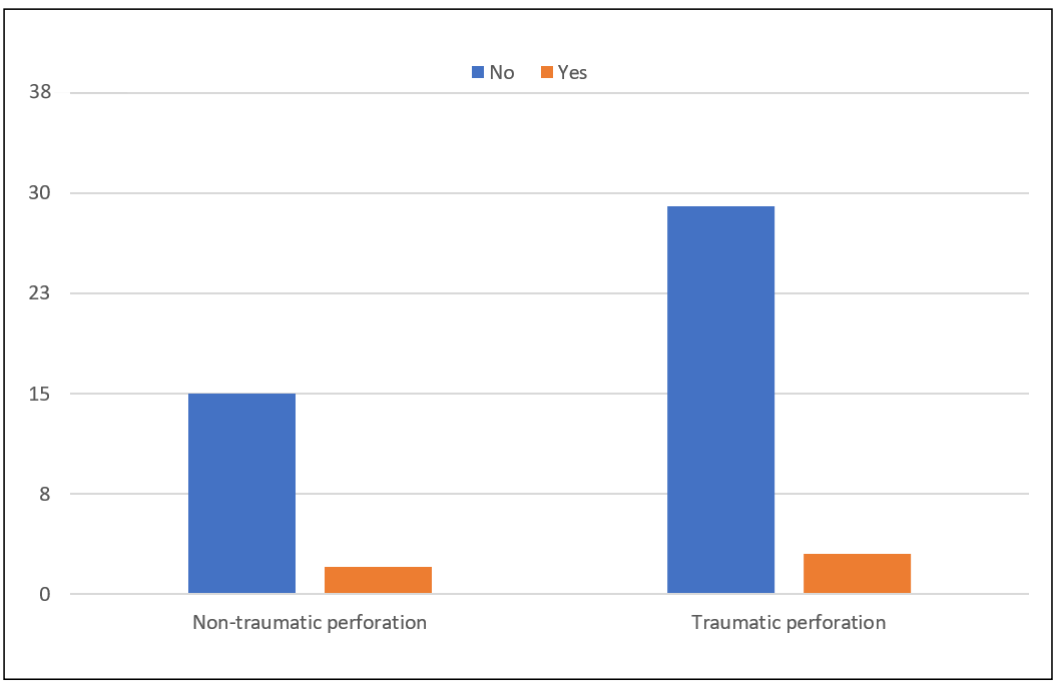
		Dehiscence		Total
		No	Yes	
ESWEP Score	<= 11	20	1	**21**
	> 11	3	4	**7**
Total		**23**	**5**	**28**

Table 5. Cases of dehiscence according to the cause of perforation.

		Dehiscence		Total
		No	Yes	
Causa	Non-traumatic perforation	15	2	**17**
	Traumatic perforation	29	3	**32**
Total		**44**	**5**	**49**



Graph 3. Cases of dehiscence by ESWEP Score cutoff in patients with serum albumin measurement.



Graph 4. Cases of dehiscence by cause of perforation.

An association between primary closure dehiscence and the cause of perforation was analyzed. ***(Table 5 and Figure 4)*** The results obtained indicate that both variables are independent from each other with a p-value of 0.57 obtained using the Fisher's exact test. Based on this result, we can infer that the ESWEP Score, initially evaluated only in patients with non-traumatic perforation, is applicable to both groups of patients (non-traumatic perforation/traumatic perforation).

We assessed the relationship between primary closure dehiscence and the suture material used for it. Through the Fisher-Freeman-Halton exact test, it was evident that the analyzed variables are independent from each other with a p-value of 0.729.

DISCUSSION

Although we chose to apply the tool in a broader range of scenarios compared to the study in which the ESWEP Score was validated by Ammar & Colleagues, our sample size was smaller. Only one case was approached with minimally invasive surgery, while the rest were treated through laparotomy. There is evidence of lower morbidity for procedures performed through minimally invasive approaches.[10]

Based on the established cutoff point, only 83.7% of patients were candidates for primary closure techniques. However, for the studied scenarios, tools have not yet been validated. We observed a decrease in the mean ESWEP Score when compared to the global mean. This reduction can be attributed to the exclusion of a parameter that contributes to the score. In the metabolic response to major trauma during the Cuthbertson phases, the Ebb phase, which occurs 12-24 hours after trauma, does not involve protein catabolism. Thus, measuring serum albumin levels in the early stages of these patients may not be essential.[11]

The characteristics of patients with traumatic perforation included in the study correlate with global literature regarding the segments of the digestive tract most affected in this condition. This is evident in the predominance of small intestine perforations in cases of abdominal trauma.[12] Peptic ulcer constitutes the leading cause of gastroduodenal perforation, including traumatic perforation which ranks second.[13] Other causes include malignancy, with less frequent cases of mesenteric infarction or volvulus. Approximately 5-20% of peptic ulcer patients experience perforation, with factors contributing to perforation including NSAID consumption, aspirin, corticosteroids, stress, alcohol abuse, and tobacco use.[14]

There is a contrast in the percentage of patients undergoing simple primary closure versus those undergoing resection with anastomosis. This may be explained by the fact that the first therapeutic option for gastrointestinal perforation is simple primary closure. Up to 90% of penetrating intestinal injuries can be treated with primary closures or deferred primary anastomosis if damage control surgery is required.[8,15] For perforated peptic ulcers, various surgical techniques are used. Omental patch closure remains the gold standard for peptic ulcer perforation.[16] Gastrectomy is reserved for extensive ulcers.

All patients with a score above 11 experienced dehiscence. It is important to note that the limitation of our findings is the small population in which the statistical analysis was performed. However, since there are no other globally recognized scales guiding surgical decisions between primary closure and stomas in cases of traumatic perforation, our results suggest that performing primary closure techniques in patients with an ESWEP Score below 11 is safe.

Recognizing the potential usefulness of the ESWEP Score for surgical decision-making encourages us to include serum albumin measurement in the laboratory evaluation of patients with gastrointestinal perforation. This would ensure adherence to a previously validated scale. While the statistical significance remained for both the total patients included and the group of 28 patients with available albumin levels, the value of full adherence is evident.

There is little difference between absorbable and non-absorbable sutures in terms of their use in primary closures and anastomoses.[17] Our results indicated independence between primary closure dehiscence and suture material. It's worth noting that none of the cases evaluated used mechanical closure devices. However, the variety of suture materials in a small population limits the generalizability of this result. Suture material is not considered within the ESWEP Score.

Currently, approaches for patients with gastrointestinal perforation include laparoscopic and open surgery.18 In the cases included in this study, only one was performed laparoscopically, despite current literature documenting superior outcomes in terms of morbidity and mortality for laparoscopic procedures in gastrointestinal perforation.[9] However, the factors influencing the choice of surgical approach were not described. Identifying this situation, supported by existing information, presents an opportunity for service quality improvement.

CONCLUSION

The validated ESWEP Score tool, originally developed for patients with infectious etiology of enteric perforation, could also be useful in cases of traumatic enteric perforation as well as in perforations occurring in other segments of the digestive tract such as the stomach and colon.

Validating the cutoff point established by Ammar & Colleagues across various scenarios presented in this study is impactful. Through this cutoff, we can determine who is suitable for primary closure techniques in future cases requiring surgical treatment. It's worth noting that the study's demonstration of the independence between the origin of perforation (traumatic/non-traumatic) and primary closure dehiscence strengthens the argument that this scale is applicable in diverse scenarios.

It would be relevant to explore factors related to complications other than primary closure dehiscence. However, in our study, since these complications occurred in only 4% of total patients, the evaluation of such characteristics was limited. This could be a subject for future research in larger populations.

Currently, approaches for patients with gastrointestinal perforation include laparoscopic and open surgery.18 In the cases included in this study, only one was performed laparoscopically, despite current literature documenting superior outcomes in terms of morbidity and mortality for laparoscopic procedures in gastrointestinal perforation.9 However, the factors influencing the choice of surgical approach were not described. Identifying this situation, supported by existing information, presents an opportunity for service quality improvement.

Having established the association between the ESWEP Score and primary closure dehiscence across various circumstances allows us to standardize criteria for therapeutic decision-making. This ensures that treatment choices are solely evidence-based, potentially leading to a reduction in complications and improvements in service quality indicators. The opportunity to replicate the study in a larger population remains, and it can contribute to further enhancing the evidence-based approach to surgical decision-making.

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Laparoscopic versus conventional splenectomy: experience in the general surgery service of the Central Hospital of the Instituto de Previsión Social

Esplenectomía laparoscópica versus convencional: experiencia en el servicio de cirugía general del Hospital Central del Instituto de Previsión Social

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ABSTRACT

Introduction: Splenectomy is indicated in the management of hematological and oncological diseases and also trauma. The objective of this study was to compare the results of conventional and laparoscopic approaches to splenectomy in a reference center. **Materials and methods:** an observational, comparative, cross-sectional study was carried out. Patients older than 16 years who underwent splenectomy in the General Surgery Service of the Social Prevention Institute between 2019 and 2021 were studied. Data were obtained from the Hospital Information System. **Results:** 112 patients were evaluated, 65% men, 35% women, with a median age of 48 years. 41% were scheduled surgeries and 59% emergencies. 93% by conventional route and 7% laparoscopic. Those with a laparoscopic approach were elective surgeries, mainly due to hematological diseases. 44% of the splenectomies were due to trauma, all by conventional approach. The rate of postoperative complications was 23% in conventional splenectomies and 12,5% in laparoscopic ones, with re-bleeding being the most frequent by conventional approach. 78% had no complications. **Conclusion:** Conventional splenectomy continues to be more frequent than laparoscopic splenectomy, which requires certain training by the surgeon, is feasible as a procedure and offers advantages in reducing complications.

Keywords: Splenectomy, Laparoscopy, Postoperative Complications.

RESUMEN

Introducción: La esplenectomía está indicada en el manejo de enfermedades hematológicas, oncológicas y también traumatismos. El objetivo de este estudio fue comparar los resultados del abordajes convencional y laparoscópico de esplenectomía en un centro de referencia. **Material y métodos:** se realizó un trabajo observacional, comparativo, de corte transversal. Se estudiaron pacientes mayores de 16 años sometidos a esplenectomía en el Servicio de Cirugía General del Instituto de Previsión Social entre 2019 y 2021. Los datos fueron obtenidos del Sistema Informático Hospitalario. **Resultados:** Se evaluaron 112 pacientes, 65% hombres, 35% mujeres, con una mediana de edad de 48 años. 41% fueron cirugías programadas y 59% urgencias. El 93% por vía convencional y 7% laparoscópico. Las de abordaje laparoscópico fueron cirugías programadas, principalmente por enfermedades hematológicas. 44% de las esplenectomías fueron por traumatismo, todas por vía convencional. La tasa de complicaciones postoperatorias fue 23% en esplenectomías convencionales y 12,5% en laparoscópicas, siendo el resangrado la más frecuente por vía convencional. 78% no presentaron complicaciones. **Conclusión:** La esplenectomía convencional sigue siendo más frecuente que la laparoscópica, la cual requiere cierto entrenamiento por parte del cirujano, es factible como proceder y ofrece ventajas en la reducción de complicaciones.

Palabras claves: Esplenectomía, Laparoscopía, Complicaciones Posoperatorias.

INTRODUCTION

The spleen is a lymphoid organ that combines both innate and adaptive immune responses in an organized manner. Its structure allows it to perform functions such as phagocytosis of red blood cells, iron recycling, and the recognition and elimination of pathogens, granting it antibacterial and antifungal immune activity. In certain pathological conditions, there is an increased destruction of red blood cells, platelets, and white blood cells, which may necessitate surgical resection.[1]

Splenectomy is indicated for the management of primary hematological disorders such as immune thrombocytopenic purpura (ITP), autoimmune hemolytic anemia (AIHA), hereditary spherocytosis (HS), as well as for oncological conditions like

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leukemia and lymphoma, particularly when secondary hypersplenism occurs. [1]

Splenectomy can be performed through an open or laparoscopic approach. Over the last two decades, the laparoscopic approach has gained preference in the field of surgery. This method has demonstrated significant benefits, including a reduction in intraoperative and postoperative complications, decreased postoperative pain, reduced need for blood transfusions, and shorter hospital stays.[1]

Despite these advantages, the choice between the two approaches depends on various factors, such as the patient's surgical history, the urgency of the surgery, the patient's hemodynamic stability, and the presence of splenomegaly. Although splenomegaly has been associated with an increased risk of intraoperative bleeding and the potential need for conversion to open surgery, it is not considered an absolute contraindication for laparoscopic splenectomy.

The General Surgery Department at the Central Hospital of Instituto de Previsión Social (HC-IPS) is a nationally recognized surgical center. In this context, the present research was conducted with the aim of comparing the outcomes between the laparoscopic and conventional approaches in splenectomy, in order to provide valuable insights for informed clinical decision-making and enhance the quality of medical care.

MATERIALS AND METHODS

An observational, comparative, retrospective, cross-sectional study was conducted, in which all patients over 16 years of age who underwent open or laparoscopic splenectomy at the HC-IPS between 2019 and 2021 were evaluated. Patients with splenic pathologies of traumatic origin, hematological disorders, and those who required splenectomy due to complications from other surgical procedures were included in the study. Data were collected from the Hospital Information System.

To obtain information related to preoperative variables (age, gender, diagnosis, nature of splenectomy), intraoperative variables (approach, complications, bleeding, drains), and postoperative variables (complications), a review of medical records, operative reports, and daily patient progress notes was conducted. This information was recorded and stored in an electronic database created using Microsoft Excel 2016. Confidentiality and privacy of patient identities were strictly maintained throughout the study.

RESULTS

During the period from 2019 to 2021, a total of 112 patients underwent surgery, with 73 males (65.2%) and 39 females (34.8%) patients. The age range was from 16 to 86 years, with a median age of 48 years. Of the surgeries, 46 (41.1%) were elective procedures, while 66 (58.9%) were performed as emergencies. In terms of surgical approach, 104 (92.9%) were performed using conventional or open approach, and 8 (7.1%) were done laparoscopically. All laparoscopic surgeries were scheduled procedures, among which 6 were diagnosed with immune thrombocytopenic purpura (ITP), 1 with abscess, and 1 with splenic cyst. Among the conventional approach surgeries, splenectomies due to trauma were more common (49 cases), followed by other causes such as pancreatic, colon, stomach surgeries, retroperitoneal tumors, and others.

The most relevant demographic and preoperative clinical characteristics based on the surgical approach are presented in ***Table 1***. The surgical approach (open or laparoscopic), in relation to the type of surgery (emergency/elective), is detailed in ***Table 1***. The percentage of using some form of drainage in open and laparoscopic surgeries for both emergency and elective cases is reflected in ***Table 2***. Drainage was used in 80 patients (71.4%).

Postoperative complications in patients who underwent open surgery (23.1%) were higher compared to those in the laparoscopic group (12.5%). Complications included collections, abscesses, fistulas, evisceration, surgical site infections, hemoperitoneum, and a case of fecal peritonitis and hematoma. Among patients who underwent open surgery, 17 (16.3%)

Tabla 1. Demographic and Clinical Characteristics. Open Surgery Laparoscopic Surgery Total Demographic Characteristics.

	Open Surgery	Laparoscopic Surgery	Total
Demographics			
n (%)	104 (92,9%)	8 (7,1%)	112 (100%)
Age (range) in years	49 (17-86)	37 (16-63)	48 (16-86)
Male	72	1	73 (65,2%)
Female	32	7	39 (34,8%)
Diagnosis			
Trauma	49	0	49 (43,8%)
ITP *	7	6	13 (11,6%)
Abscess	7	1	8 (7,1%)
Splenomegaly	5	0	5 (4,5%)
Cysts	1	1	2 (1,8%)
Spleen infarction	1	0	1 (0,9%)
Other diagnoses	34	0	34 (30,3%)
Type of surgery			
Emergency	66	0	66 (58,9%)
Scheduled	38	8	46 (41,1%)

** ITP: Immune Thrombocytopenic Purpura*

Table 2. Use of drains according to type of surgery and approach.

	Open Surgery	Laparoscopic Surgery	Total
Emergency surgery			
With drainage	48	0	48 (42,8%)
Without drainage	18	0	18 (16,1%)
Scheduled surgery			
With drainage	24	8	32 (28,6%)
Without drainage	14	0	14 (12,5%)
Total			
With drainage	72	8	80 (71,4%)
Without drainage	32	0	32 (28,6%)

Table 3. Complications classified by surgery approach.

	Open Surgery	Laparoscopic Surgery	Total
With complications			
Death	9	0	9 (8,0%)
Bleeding, hemoperitoneum	8	0	8 (7,1%)
Abscesses	4	0	4 (3,6%)
Evisceration	3	0	3 (2,7%)
Surgical site infection	2	0	2 (1,8%)
Fistulas	2	0	2 (1,8%)
Fecal peritonitis	2	0	2 (1,8%)
Hematoma	0	1	1 (0,9%)
Patients with complications	24 (23,1%)	1 (12,5%)	25 (22,3%)
Without complications			
Patients without complications	80 (76,9%)	7 (87,5%)	87 (77,7%)
Reintervention			
Patients who underwent reoperation	17 (16,3%)	1 (12,5%)	18 (16%)

Note: Patients had more than one complication.

required re-intervention, while in the laparoscopic group only one did (12.5%). The main reason for re-intervention in the open surgery group was hemoperitoneum and intraabdominal collection, whereas the patient who underwent re-intervention in the laparoscopic group had a hematoma in the splenic bed. Finally, there were nine deaths (8%) in the open surgery group, all of which were associated with hemodynamic compromise. The most frequent complications in each of the different surgical approaches are detailed in Table 3. A total of 87 patients (78%) did not experience any complications.

DISCUSSION

The primary indication for splenectomy in this series is spleen trauma. Splenectomy for hematologic diseases such as idiopathic thrombocytopenic purpura (refractory to medication), for example, was indicated for 13 patients (11.6%). Other indications for surgery included splenic abscess, splenic infarction, splenomegaly, among others, as reported in previous studies.[3-4]

Being a highly vascularized and fragile organ, the spleen poses a complex surgical challenge due to its anatomical position and its relationship with adjacent organs. There is a high potential for complications during splenectomy, particularly hemorrhage in patients with splenomegaly, increasing the risk of reoperation. The findings of this study indicated a higher frequency of rebleeding in open surgery compared to laparoscopic approaches, a result consistent with those presented in other published series.[5-9]

Chaud, in their study involving 94 patients who underwent splenectomy, found that 16% presented pancreatic complications, mainly pancreatic fluid collections and fistulas, which did not occur in our study.10 Similarly, Kercher and Demeure had patients with septic collections in the surgical area, coinciding with our study.[11-12]

In their study, Feldman et al. mentioned that spleens with sizes between 15-25 cm due to splenomegaly can be removed laparoscopically but with a higher risk of bleeding and conversion to open surgery.[13] The researchers in this study believe that laparoscopic approach should be attempted in such cases when the surgical technique is well-mastered and suitable instruments are available; otherwise, conventional splenectomy is advisable. It should be noted that technically, placing the spleen in the extraction device, macerating it, and, if unsuccessful, making incisions in less visible sites, which need to be adjusted to its size to prevent rupture, can be challenging.

Some authors define the learning curve as a decrease in surgery time or a decrease in complication rates that can be achieved after a minimum of 20 procedures.[14.-15] The latter oc-

curred in this study, as the frequency of postoperative complications was lower in the laparoscopic group (12.5%) compared to the open approach group (23.1%). These rates are higher than those published in a meta-analysis of 508 laparoscopic splenectomies in the pediatric population, where the rate of postoperative complications was 9.4%16; however, they are slightly lower than those reported by Winslow and Brunt in a subsequent meta-analysis that included 25 studies (2119 laparoscopic splenectomies and 821 open ones), with documented rates of postoperative complications of 15.5% for laparoscopic and 26.6% for open approaches.[7] Among patients with complications in the open group, 17 patients (16.3%) required re-intervention compared to 1 patient (12.5%) needing re-intervention in the laparoscopic surgery group.

Regarding the learning curve, Dagash et al. state that there is no specific minimum number of procedures required to achieve mastery in an advanced laparoscopic technique.[17] To develop a learning curve without major complications and achieve standardization of the technique, caution should be exercised in patient selection.[5]

It's important to consider that the HC-IPS is a teaching hospital with a General Surgery postgraduate program, and the group of surgeons involved in the study has training and experience primarily in open splenectomy. The learning curve for laparoscopic splenectomy is still in its early stages but is increasing as more training is provided to the medical staff.

CONCLUSION

Conventional splenectomy remains more common than laparoscopic splenectomy, considering that the primary cause of splenectomies is emergency surgery for blunt abdominal trauma. Both approaches have a significant rate of complications. Laparoscopic splenectomy requires specific training on the part of the surgeon, is a feasible procedure, and offers advantages such as a reduction in the number of complications. It also presents benefits over the conventional approach in the management of hematologic diseases, particularly in terms of intraoperative bleeding.

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Percutaneous surgery, 5 years experience in a medium complexity hospital

Cirugía percutánea, experiencia de 5 años en un hospital de mediana complejidad

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SUMMARY

Introduction: Percutaneous drainage is an effective therapy for collections and other pathologies. The commonly used imaging guides are ultrasound and tomography. **Methods:** Descriptive, retrospective cross-sectional study, review of medical records of patients who underwent percutaneous drainage at the Hospital Regional de Encarnación over a 5-year period were analyzed. **Results:** 81 patients were included (53% males, 47% females), with an average age of 50 years. Indications were as follows: 21% hepatic abscess, 11% postoperative collections, 10% biliary drainage, 9% nephrostomies, and 7% gastrostomies. 56% of procedures were guided by ultrasound. The Seldinger technique was predominantly used, with the multipurpose pigtail catheter employed in 65% of cases, and the central venous catheter in 23%. The average catheter duration was 15 days, with a 4% complication rate. The success rate was 98.5%. **Conclusions:** Percutaneous surgery is effective and safe. The use of catheters without internal fixation (central venous catheters) is valuable in emergency situations, posing no significant risk.

Key words: Percutaneous drainage, collection, ultrasound guidance, central venous catheters.

RESUMEN

Introducción: El drenaje percutáneo es una terapéutica eficaz para las colecciones y otras patologías. Las guía imagenológicas utilizadas suelen ser la ecografía y la tomografía. **Método:** Estudio descriptivo, retrospectivo de corte transversal. Se analizaron las historias clínicas de los pacientes sometidos a drenaje percutáneo en el Hospital Regional de Encarnación en un periodo de 5 años. **Resultados:** Se incluyeron 81 pacientes (53% varones, 47% mujeres), edad promedio 50 años. Las indicaciones fueron: 21% absceso hepático, 11% colecciones postoperatorias, 10% drenaje biliar, el 9% nefrostomías; 7% gastrostomías. El 56% de los procedimientos fueron ecoguiados. La técnica de Seldinger se utilizó mayormente; el catéter multipropósito tipo pigtail se utilizó en el 65% de los casos y el de vía venosa central en el 23%. El promedio de permanencia del catéter fue 15 días; con 4% de complicaciones. La tasa de éxito fue del 98,5%. **Conclusiones:** La cirugía percutánea es eficaz y segura. La utilización de catéteres sin medios de fijación interna (via venosa central) son útiles en situaciones de urgencia, no representando mayor riesgo.

***Palabras clave*:** Drenaje percutáneo, colecciones, guía ecográfica, catéteres venosos centrales.

INTRODUCTION

Intra-abdominal abscesses can occur in various regions of the abdomen and may arise following surgical procedures, trauma, or as a result of infections or abdominal inflammation. If left untreated, abscesses can spread to adjacent structures, leading to complications. [1]

In a case series study, ultrasound-guided percutaneous drainage (PD) was curative in 82.6%, palliative in 8.7%, and failed in 8.7% of cases, establishing it as a safe alternative to surgery. [2] Another study reported a 99% success rate for PD. [3] Among the various applications of PD, biliary drainage can be used as a treatment option for obstructive jaundice when endoscopic retrograde cholangiopancreatography (ERCP) is unsuccessful, with a low frequency of complications. [4]

For hepatic abscesses, PD has become the treatment of choice. A single puncture and aspiration suffice for abscesses under 5 cm in diameter, while larger abscesses require image-guided PD with the placement of a multipurpose pigtail catheter. [5,6] Additionally, PD can be used for psoas muscle abscesses. [7,8]

PD is also indicated for complications of pancreatitis, such as pancreatic pseudocysts, infected collections, or necrotizing pancreatitis, to evacuate contents and avoid open necrosectomy. [9,10]

The multipurpose pigtail catheter is the most commonly

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used, with the catheter diameter determined by the material being drained, thicker tubes preferred for more viscous material. In our setting, administrative issues sometimes necessitate the use of alternative catheters, such as narrower central venous catheters.

This study aims to present the experience with percutaneous procedures performed in the Surgery Department of the Regional Hospital of Encarnación from 2017 to 2021.

MATERIALS AND METHODS

This is an observational, descriptive, cross-sectional, retrospective study. A non-probabilistic sampling of consecutive cases was conducted, involving a review of medical records of patients who underwent percutaneous procedures at the Regional Hospital of Encarnación, Paraguay, between January 2017 and December 2021.

Inclusion criteria: Complete medical records of patients who underwent percutaneous procedures for therapeutic, bridge-to-definitive, or diagnostic purposes were included.

Exclusion criteria: Incomplete medical records or records of patients undergoing surgical drainage were excluded.

Variables studied included age, sex, diagnosis, imaging guide used for diagnosis and the procedure, anesthesia, catheter type and caliber, catheter dwell time, success rate, and complications.

RESULTS

The study included 81 patients who underwent percutaneous procedures during the specified time frame. Of these, 53% (43 patients) were male and 47% (38 patients) were female, with an average age of 50 years (range 15-87, standard deviation 17).

Regarding the indications for the procedure, hepatic abscesses accounted for the main indication at 21% (17 patients), followed by postoperative collections at 15% (12 cases), biliary drainage for neoplastic-related jaundice at 10% (8 cases), nephrostomies for severe hydronephrosis due to oncological pathologies at 9% (7 cases), gastrostomies for nutritional support at 7% (6 cases), and renal and perirenal abscesses at 6% (5 cases). Other less frequent cases are detailed in ***Table 1***.

The auxiliary imaging methods used for diagnosing the conditions that led to perform a percutaneous drainage was computed tomography (CT) in 67% (54) of cases, and ultrasound in 33% (27).

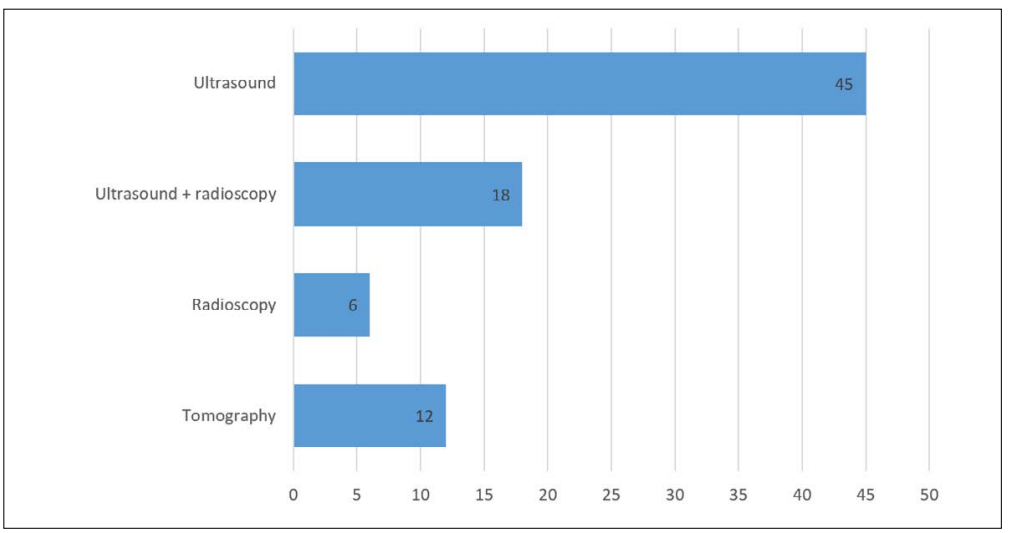
Regarding the imaging method used for the guidance of puncture, ultrasound was used in 56% (45) of procedures. A combination of ultrasound and fluoroscopy (transparietohepatic drainages) was used in 22% (18) of cases. CT was employed in 15% (12) of cases, and fluoroscopy alone was used in 7% (6) of cases, which corresponded to percutaneous gastrostomies ***(Graph 1)***.

When evaluating the PD technique, it was identified that the Seldinger technique was used in 93% (75) of cases, trocar technique in 6% (5), and tandem technique in 1% (1). ***(Graph 2)***.

Table 1. Distribution according to diagnosis of patients undergoing percutaneous drainage. n=81

Diagnosis	n	%
Hepatic abscess	17	21 %
Postoperative collection	12	15 %
Biliary drainage	8	10 %
Nephrostomy	7	9 %
Gastrostomy	6	7 %
Renal-perirenal abscess	5	6 %
Complicated hepatic cyst	4	5 %
Pancreatic pseudocyst	4	5 %
Pancreatic abscess	4	5 %
Psoas abscess	3	4 %
Retroperitoneal abscess	2	2 %
Colonic diverticulitis	2	2 %
Infected rectus sheath hematoma	2	2 %
Others *	5	6 %
Total	**81**	**100 %**

** Splenic cyst 1 case, mesenteric cyst 1, post-traumatic hepatic bilioma 1, wall abscess 1, prevesical abscess 1.*



Graph 1. Distribution according to the imaging method used for the procedure's puncture guidance. n=81.

Regarding the type of anesthesia used, sedation with local anesthesia was found in 47%, corresponding to 38 cases (2% lidocaine at a dose of 5mg/kg and propofol at 1mg/kg). Sedation alone was used in 7% (6) of cases, local anesthesia alone in 40% (32), and general anesthesia in 6% (5), as shown in ***Graph 3***

The principal catheter udes for PD was the multipurpose pigtail catheter in 64% (52) of cases, followed by the central venous catheter in 23.5% (19) of cases. The catheter with an inflatable balloon (gastrostomy set) was used in 7.5% (6) of cases, and the Malecot type was used in 5% (4) of cases. The use of central venous catheters was due to the lack of availability of multipurpose catheters in the hospital.

The most used catheter sizes were 10Fr. (31%), 12Fr. (23.5%), and 7Fr. (23.5%) ***(Graph 4)***.

The average catheter dwell time was 15 days, with a range of 1 to 65 days and a standard deviation of 10 days. Patients who were discharged with the catheter still in place were excluded from this determination.

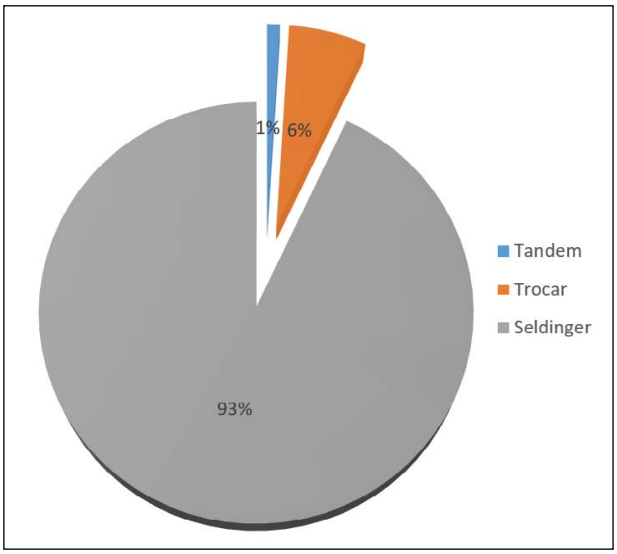
Complications occurred in 4% (3) of cases: 1 case of peritoneal catheter infection, 1 case of accidental catheter removal, and 1 case of catheter obstruction that was resolved by exchanging the catheter.

Follow-up could not be conducted for 10 patients due to various reasons. The success rate among patients who could be followed was 70 out of 71, representing a 98.5% success rate. One failure was observed in a patient with a drained hepatic abscess that recurred a few weeks after catheter removal, requiring a new drainage procedure.

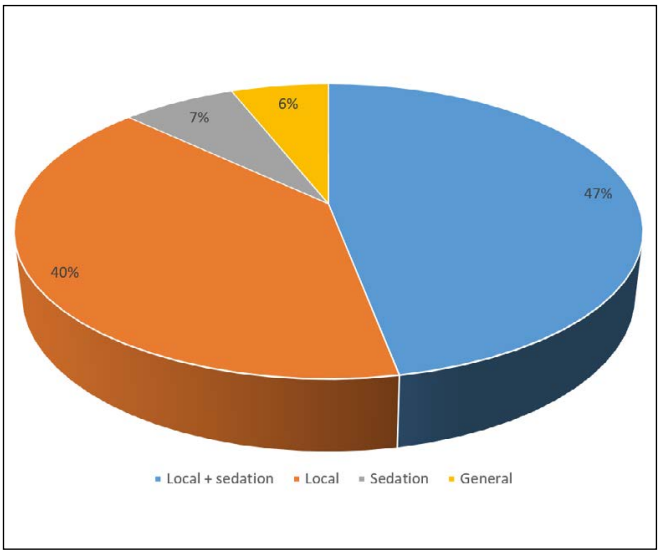
DISCUSSION

About gender distribution, our findings differ from the literature, where a slight predominance of women was reported (55%). In our sample, male patients were more common, accounting for 53%.

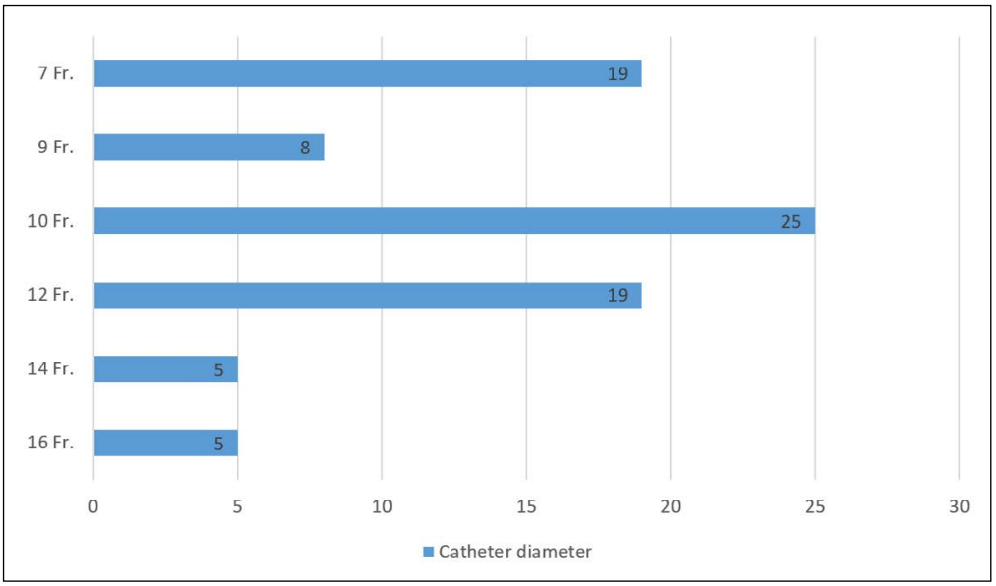
The literature mentions indications for PD such as hepatic abscesses, acute cholecystitis, biliomas, biliary obstruction, pseudocysts, and pancreatic abscesses, among others, [1] which



Graph 2. Distribution of cases according to the puncture technique used for the procedure. n=81.



Graph 3. Type of anesthesia used for the procedures. n=81.



Graph 4. Distribution of catheters used according to their diameter. n=81.

aligns with the drainage indications observed in our evaluated population.

In most cases, clinical suspicion prompts the need for imaging confirmation, with CT being the preferred method. [7] In our study, CT was used in 67% of cases for diagnosing the conditions that necessitated various percutaneous drainages.

Existing literature cites that ultrasound-guided PD is effective for managing abdominal collections. [2] In our sample, ultrasound was the most commonly used method in 56% of cases, often combined with fluoroscopy in 22% of cases.

Carlos Priarone's publication regarding puncture techniques mentions that the majority of interventions (86.6%) are performed using the Seldinger technique, [3] which is similar to our study, where the Seldinger technique was used in 93% of cases.

Regarding the type of catheter used, literature does not commonly discuss the use of a 7Fr central venous catheter for drainage purposes. In our sample, we utilized this type of catheter in 24% of cases with positive outcomes and no complications.

Existing literature reports percutaneous drainage success rates ranging from 80% to 100% depending on the location. [11] In our study, the success rate was 98.5%.

CONCLUSION

In our case series, the majority of patients undergoing drainage procedures were male. The primary indication for drainage was hepatic abscesses, followed by postoperative collections. The Seldinger technique under ultrasound guidance was the most commonly used method for catheter placement, and the multipurpose pigtail catheter was the most frequently employed. The average catheter dwell time was 15 days, and the procedure's success rate was 98.5%.

The use of catheters without internal fixation mechanisms, such as central venous catheters in our case, proves useful in emergency situations and does not present a higher risk in our experience.

Conflict of interests: The authors declare no conflicts of interest.

Author contributions: All authors contributed equally to the preparation of the article.

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Ethical considerations: Data were treated with confidentiality, equality, and justice, in accordance with the principles of Helsinki.

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REVIEW ARTICLE Doi: 10.18004/sopaci.2023.agosto.28

Health care-associated infections after surgical procedures in adult patients: scoping review

Infecciones asociadas a la atención de la salud posterior a procedimientos quirúrgicos en pacientes adultos: scoping review

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ABSTRACT

Objective: To establish the infections associated with health care in surgically treated patients, without considering operative site (ISO) infections. **Materials and methods**: A search of the literature was performed in MEDLINE, CENTRAL, LILACS databases in addition to unpublished literature, identifying studies related to infections associated with health care in adult patients who underwent surgery. **Results:** In the search performed, 25 articles were selected, from which the results were extracted. The most frequent IAAS in the studies reviewed were: ventilator-associated pneumonia (36%), pneumonia associated with health care (32%), urinary tract infections by urinary catheter (48%), infections associated with venous catheter (8 %). **Conclusion:** Infections associated with health care in patients brought to surgical procedures, most frequently found are ventilator-associated pneumonia, pneumonia associated with health care, urinary tract infection by catheter and venous catheter-associated infections. However, they continue to generate questions, since ISO is the most documented, suggesting more studies and research.

Key words: Infection associated with health care, nosocomial infection, postoperative infections, surgical procedures.

RESUMEN

Objetivo: Establecer las infecciones asociadas a la atención de la salud en pacientes intervenidos quirúrgicamente, sin tener en cuenta las infecciones del sitio operatorio (ISO). **Materiales y métodos:** Se realizó una búsqueda de la literatura en las bases de datos de MEDLINE, CENTRAL, LILACS además de la literatura gris, para identificar estudios relacionados con infecciones asociadas a la atención de la salud en pacientes adultos que fueron intervenidos quirúrgicamente. **Resultados:** En la búsqueda realizada se seleccionaron 25 artículos de los cuales se extrajeron los resultados. Las IAAS más frecuentes en los estudios revisados fueron: neumonía asociada al ventilador (36%), neumonía asociada al cuidado de la salud (32%), infecciones de tracto urinario por catéter urinario (48%), infecciones asociadas a catéter venoso (8%). **Conclusión:** Las infecciones asociadas a la atención de la salud frecuentemente encontradas en pacientes llevados a procedimientos quirúrgicos son la neumonía asociada al ventilador, neumonía asociada al cuidado de la salud, la infección del tracto urinario por catéter y las infecciones asociadas a catéter venoso, sin embargo, las infecciones de sitio operatorio (ISO) son las más documentadas, situación que requiere mayor atención y abordaje a través de otros estudios de investigación.

Palabras clave: Infección asociada a la atención en salud, Infección nosocomial, infecciones posquirúrgicas, procedimientos quirúrgicos.

INTRODUCTION

Healthcare-associated infection (HAI), previously known as nosocomial or intrahospital infection, is defined as an infection that arises from the process of medical or surgical care not inherent to the reason for admission to the hospital, without prior symptoms or during the incubation period of the disease. [1–6]

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HAIs are a global public health problem, as indicated by the World Health Organization (WHO) in 2002, which published a study involving 55 hospitals from 14 countries, reporting an average of 8.7% HAIs in hospitalized patients, corresponding to over 1.4 million individuals. [3,5] This is reinforced by data from the Centers for Disease Control and Prevention (CDC) in the US, which documents approximately 1.7 million people with HAIs and an annual mortality rate of around 99,000 individuals [3]; it also estimates that the cost of HAIs in the year 2000 was $6 billion. [6,7] In a study in the United Kingdom (UK), a general HAI rate of 7.8% was found in 4,000 patients, leading to an 11-day extension in hospital stay, with costs 2.8 times higher than those of comparable non-infected patients. Additionally, the mortality rate of the infected group was 13%, compared to 2% in the non-infected group. [1,8]

In 2010, The Lancet compiled 220 publications from 1995 to 2008, including studies from the Americas (22%), Europe (20%), Southeast Asia (16%), Eastern Mediterranean (8%), Africa (5%), and other regions (29%). The study revealed that the prevalence of HAIs in developing countries was 15.5 per 100 patients, which could increase to 34.2 per 1,000 patient-days in ICU patients, tripling the rates reported in the US. [9]

In Colombia, the National Epidemiological Surveillance Group of Intensive Care Units (GRUVECO) reported a ventilator-associated pneumonia (VAP) rate of 7.37 per 1,000 ventilator days, a catheter-associated bloodstream infection (CAB) rate of 1.77 per 1,000 catheter days, and a urinary tract infection associated with urinary catheterization (UTIAC) rate of 3.04 per 1,000 urinary catheter days. [4] In 2012, surveillance of HAIs was implemented, prioritizing information on Device-Associated Infections (DAI). In Bogotá, a total of 13,762 cases of HAIs were reported in hospital and outpatient services. [1,2,4]

Regarding the classification of HAIs, there are four types associated with invasive and surgical procedures: urinary tract infection associated with urinary catheter, aspiration pneumonia, catheter-associated bloodstream infection, and surgical site infections (SSIs). Some studies have identified risk factors for HAIs related to the host (prematurity, age > 65, immunodeficiency, nutritional status), the agent (predominantly gram-negative bacilli and gram-positive cocci, bacterial resistance), and the hospital environment of the patient (more common in ICUs and operating rooms). [3,5]

Given the existing literature on HAIs in surgical patients, there is greater emphasis on SSIs, with limited information regarding other types of HAIs in this population. Hence, the importance of conducting a review focused on healthcare-associated infections other than SSIs, such as urinary tract infection associated with urinary catheterization, catheter-associated bloodstream infection, and healthcare-associated pneumonia. These infections increase the risk of functional disability, prolong hospital stays, reduce the quality of life, and in some cases increase patient mortality, leading to an exaggerated increase in healthcare costs. [1,2,5,6,8]

The objective of this review is to identify healthcare-associated infections in patients who have undergone surgical procedures, excluding SSIs.

MATERIALS AND METHODS

Search Strategy

The search was conducted by three researchers using the following databases: MEDLINE, CENTRAL, and LILACS, with language restriction (English and Spanish) and without time restrictions. A combination of MeSH terms and free-text terms was used for the search, including:

- MEDLINE: Infectious Disease Transmission, Professional-to-Patient"[Mesh] OR "Cross Infection"[Mesh]) AND "surgery"[Subheading] NOT "Surgical Wound Infection"[Mesh] con filtro: Humanos; idioma inglés - spanish
- CENTRAL: #1 Infectious Disease Transmission, Professional-to-Patient [Mesh] OR #2 Cross Infection [Mesh] AND #3 surgery NOT #4 Surgical Wound Infection [Mesh]
- LILACS: (tw:(infección hospitalaria)) AND (tw:(procedimientos quirúrgicos operativos)) NOT (tw:(infección de la herida quirúrgica)) AND (instance:"regional") AND (db:("LILACS") AND la:("es"))
- DECS: Infección Hospitalaria, Procedimientos Quirúrgicos Operativos; Infección Herida Quirúrgica.

Selection Criteria

According to the design, cohort studies, case series, cross-sectional studies, and systematic reviews that determined cases of HAIs in post-surgical patients were included. Editorials, letters to the editor, comments, studies with samples of fewer than 10 infected patients, studies in pediatric populations, outpatient surgeries, and studies where differentiation between infection and colonization was not achieved were excluded.

To include all relevant research, references from the included studies and a search of the INICC database were reviewed, resulting in 208 publications, of which 3 articles were reviewed. For the identified abstracts, the corresponding authors were contacted to inquire whether the final work had been published in a scientific journal. Additionally, the data obtained from the search in "Infection Control & Hospital Epidemiology" yielded 774 files, from which 11 were chosen based on their titles, but the total was excluded due to being letters to the editor and comments.

The principal investigator (MFE) along with LCH and DMA independently reviewed the titles and abstracts to assess eligibility criteria (N=1287). Once the titles were reviewed, the inter-rater agreement was 87.5%; differences in articles were resolved through discussion and consensus among the three reviewers.

After reviewing titles and abstracts, full-text articles (n=145) were reviewed to assess eligibility criteria. This review was conducted by MFE.

Study Selection

The database search yielded 1287 publications. After removing duplicates, 579 publications were excluded based on their titles. A total of 708 were selected for review of their titles and abstracts. Among these, 563 were excluded based on abstracts, resulting in 145 studies for full-text review. Finally, 25 articles met the eligibility criteria for the review ***(Figure 1).***

Data Extraction

Information from the articles was extracted by three reviewers (MFE, LCH, DMA) using an established format that included the following variables: primary author, year of publication, geographic location, study type, number of participants, type of surgical procedures, and primary outcome.

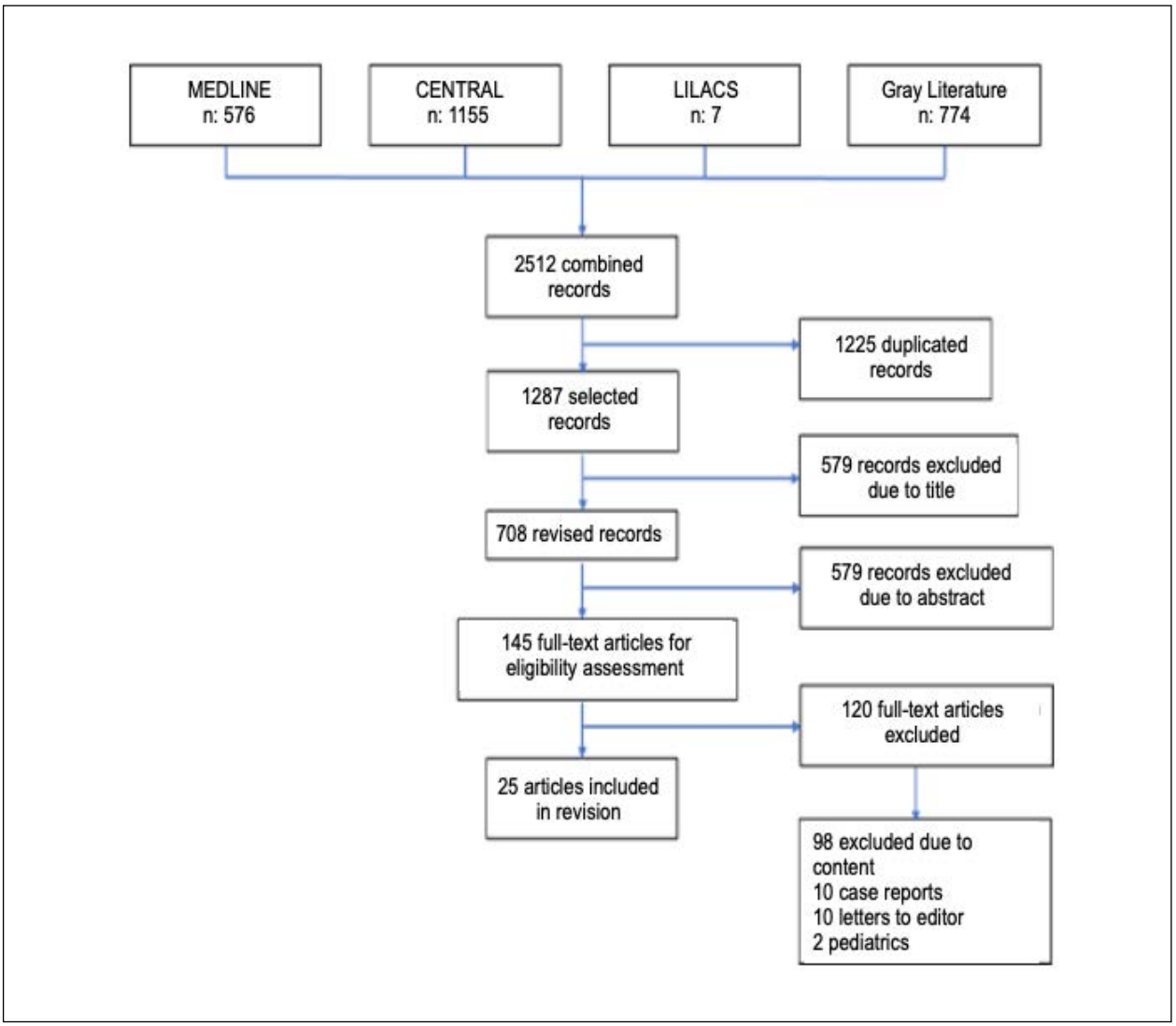

Figure 1. Flowchart of study search and selection.

RESULTS

The search yielded 1287 records, after eliminating duplicates. Among these, 579 records were excluded based on titles, resulting in 708 studies that were reviewed based on abstracts. Among these, 563 were further excluded, resulting in a final pool of 145 studies for full-text review. Out of these, 120 articles were eliminated for not meeting the selection criteria, including being letters to the editor, case reports, studies in pediatric populations, or having content not aligned with the study's objective.

Out of the total studies identified, 25 focused on healthcare-associated infections in post-surgical patients.[10–34] Specifically, 8 studies examined infections secondary to orthopedic and traumatology procedures[13,14,19,21,28,29,32,33], 5 focused on cardiovascular surgery[11,16,26,31,34], 5 on procedures in oncology patients[10,15,18,20,30], 5 on gastrointestinal surgery[17,22,23,25,27], and 2 on neurosurgical procedures[12,24].

The studies were published between 1996 and 2017 and were conducted in various countries, including the United States[11–15,17,18,21,22,24,27,29,33], Canada[25], the United Kingdom[28,30], the Netherlands[10], Switzerland[16], Sweden[19], Spain[26,32,34], Israel[20], Mexico[23], and Slovenia[31]. All the studies were written in English. The characteristics of the included studies are presented in ***Table 1.***

Regarding the study design, one-third of these studies were retrospective, with the majority being observational. Only one of the reviewed articles included a case-control design, and two studies were cohort studies. In terms of the surgical procedures performed, one-third of the studies were related to major orthopedic and trauma surgeries, followed by cardiovascular surgeries and gastrointestinal procedures.

The HAIs identified based on the results are as follows: VAP was reported in 6 studies (24%) [13-15,21,27,34], Healthcare-associated pneumonia in 11 studies (44%) [10,11,18,19,21-23,25,26,31,32], Urinary tract infections due to urinary catheter use in 12 studies (48%) [13-15,18,22,24,26,27,29,31-33], Infections associated with venous catheters in four studies (16%) [16,26,30,31], Clostridium difficile infection in three studies (12%) [12,17,28], Intra-abdominal fungal infections in one study (4%) [20] and Infections caused by MRSA were examined in one study (4%) [30].

Table 1. Characteristics of Included Studies in the Review

Author, year (country)	Study type	# of participants	Type of surgical procedure	Principal outcome
Pieter C. van der Sluis(10), 2014 (Netherlands)	Retro-prospective cohort	185	Esophagectomy due to cancer	70 (37.8%) hospitalization related pneumonia - total 9 (4.9%) ICU inmediate postoperative pneumonia 67 (36.2%) pneumonia during hospital stay
Raymond J. Strobel(11), 2016 (USA)	Retrospective	16,084	Coronary bypass graft	531 (3,3%) pneumonia
Branko Skovrlj(12), 2014 (USA)	Retrospective	2,569,043	Spnial surgery	20867 (0.11%) *C. Difficile i*nfection
Michael Mackowski(13), 2014 (USA)	Retrospective	25	Damage control surgery (thoracotomy/sternotomy)	12 (48%) VAP 1 (4%) urinary tract infection due to urinary catheter
Shu-Chen Kung(14), 2017 (USA)	Retrospective	93	Major trauma	15 (16.1%) had VAP 1 (1.07%) presented urinary tract infection due to urinary catheter
Jesse Sammon(15), 2013 (USA)	Retrospective	2,502,686	Oncological Surgery Colectomy Cystectomy Esophagogastrectomy Gastrectomy Hysterectomy Pneumonectomy Pancreatectomy Prostatectomy	4.2% urinary tract infection due to urinary catheter 3.5% VAP
Philipp Kohler(16), 2015 (Switzerland)	Retrospective	3,706	Open heart surgery	10 (0.26%) *M. Chimaera* infection
Christopher T. Aquina(17), 2016 (USA)	Retrospective cohort	150,878	Segmental colectomy, proctectomy	3323 (2.2%) *C. difficile* infection
Amit Kochhar(18), 2013 (USA)	Cross-sectional study	123,662	Oncologic surgery of the oral, laryngeal, hypopharyngeal, or oropharyngeal cavity	852 presented complications associated with surgery Pneumonia 27.1% Urinary tract infection 12.7%
Marie Stenlund(19), 2017 (Sweden)	Retrospective	4,961	Emergency abdominal surgery / trauma	90 healthcare-associated pneumonia
Evgeni Brotfain(20), 2017 (Israel)	Retrospective	149	Oncologic surgery of the upper gastrointestinal tract	49 patients had postoperative intra-abdominal infection, of which 10 had fungal invasion
Robert D. Becher(21), 2011 (USA)	Retrospective	116	72 patients in trauma ICU (TICU) 44 patients in general surgery ICU (SICU)	TICU: VAP 83.3%, healthcare-associated pneumonia 16.7% SICU: VAP 70.5%, healthcare-associated pneumonia 29.5%
John G. Armstrong(22), 2017 (USA)	Retrospective	10,108	Colectomy 7615 Abdominal perineal resection (APR) 2493	Colectomy: urinary tract infection 107 (1.4%), pneumonia 171 (2.24%) APR: urinary tract infection 88 (3.6%), pneumonia 60 (2.4%)
Gerardo Evaristo-Méndez(23), 2016 (Mexico)	Cross-sectional analytical	942	700 general surgery 242 oncologic surgery	General surgery: 9.2% of patients developed pneumonia Oncologic surgery: 10.7% of patients developed pneumonia
K. Nosova(24), 2013 (USA)	Retrospective	46,344	Craniotomy for meningioma	Men: 553 (3.9%) with urinary tract infection Women: 2024 (6.3%) with urinary tract infection
Torchia MG(25), 2000 (Canada)	Retrospective	154	Colorectal surgery	The overall rate of HAI was 17%, which was higher in patients receiving any type of transfusion, primarily pneumonia
M. Henar Rebollo(26), 1996 (Spain)	Case-control study	970	Cardiovascular surgery	Nosocomial infection occurred in 89 (9.2%) patients: SSI was the most common (5.6%) Pneumonia (3.2%) Urinary tract infection (1.8%) Deep SSI (0.9%) Bacteremia (0.7%)
Courtney Balentine(27), 2009 (USA)	Retrospective	88	Major abdominal surgery	VAP 30% Urinary tract infection 20%
P. Sharma(28), 2003 (UK)	Prospective observational	239	Hip fracture surgery	17 patients presented diarrhea associated with *Clostridium difficile* infection

▸ *Cont.*

Cont.

Heidi Wald(29), 2005 (USA)	Retrospective cohort	111,330	Hip fracture surgery	15.9% of the patients presented urinary tract infection
David J. Bowrey(30), 2007 (UK)	Prospective observational	98	Esophagectomy due to cancer	1 out of 5 patients presented MRSA* infection, with a higher risk in those who received neoadjuvant chemotherapy
Bojana Beovic(31), 2003 (Slovenia)	Prospective cohort	2,458	Vascular surgery	Lower respiratory tract infection: 228 pts Urinary tract infection: 48 pts Central nervous system infection: 47 pts Infection from vascular catheter: 19 pts
Mónica Izuel Rami(32), 2008 (Spain)	Prospective observational	286	Hip fracture surgery	25.9% presented nosocomial Infections: 36 patients with urinary tract infection 12 patients with respiratory infection 4 patients with urinary tract infection + nosocomial infection 2 patients with urinary tract infection + respiratory infection
Hosam K. Kamel(33), 2005 (USA)	Retrospective observational	138	Hip fracture surgery	Urinary tract infection in patients older than 65 years was 16% Urinary tract infection in patients younger than 65 years was 4%
Emilio Bouza(34), 2003 (Spain)	Prospective observational	356	Cardiac surgery	VAP 7.87%

*SARM: *Staphylococcus aureus* resistente a la meticilina, VAP: ventilator associated pneumonia, SSI: surgical site infection, ICU: intensive care unit

DISCUSSION

Given that HAIs are one of the main patient safety issues and are considered preventable adverse events, they can be considered some of the best indicators of the quality of care. They are significant due to their frequency, associated morbidity and mortality, increased costs, and reflection of healthcare team actions that can be modified according to current standards.[35]

In contrast to the literature, which often emphasizes urinary tract infections associated with urinary catheter use as the most common HAIs, the results of this review revealed that healthcare-associated infections in patients undergoing surgical procedures (excluding SSIs, the most documented HAI) are predominantly lower respiratory tract infections, specifically VAP.[13-15,21,27,34] These are followed by urinary tract infections secondary to the use of urinary catheters[13-15,18,22,24,26,27,29,31–33], infections associated with venous catheters[16,26,30,31], and less frequently other types of infections [Clostridium difficile(12,17,28), fungal infections[20], MRSA infections[30]].

Literature findings indicate that urinary tract infections are the most common HAIs. It is estimated that 80% of these infections are caused by the use of indwelling urinary catheters(35). While urinary tract infections cause less morbidity than other HAIs, they can still lead to bacteremia and death. It is estimated that after the second day of catheterization, the risk of bacteriuria increases by 5-10% per day. In many cases, bacteriuria is asymptomatic, and catheter removal is more effective for control than antibiotic administration.[35]

On the other hand, VAP not only leads to higher morbidity and mortality but also contributes to inappropriate antibiotic use, which in turn contributes to bacterial resistance, increased toxicity, and higher healthcare costs.[35] According to the results of the reviewed articles, VAP occurrence is dependent on patient-related factors, often seen in patients undergoing oncological procedures with multiple comorbidities, immunocompromised status, and major surgeries such as polytrauma cases, damage control procedures, and significant bleeding, requiring prolonged endotracheal intubation.

Regarding bacteremia, the primary risk factors for its development are catheterization duration, aseptic insertion practices, and ongoing catheter care.[35] In comparison with the findings of this review, it appears that the occurrence of bacteremia is primarily dependent on operator-related factors and direct transmission.

Of the studies selected for this review based on the inclusion and exclusion criteria, the majority were conducted in North America (52%)[11-15,17,18,21,22,24,25,27,29,33], followed by European countries (36%)[10,16,19,26,28,30-32,34], with only one study from Asia[20] and one from Central America[23]. It is noteworthy that no studies from South America were found, limiting the extrapolation of findings to this part of the continent. The lack of data likely limits the scope of the analysis.

Reflecting on the implications of these results, it is clear that more studies are needed, with a focus on HAIs, particularly in developing countries like those in Latin America. The absence of such studies in certain regions might be attributed to underreporting due to legal implications of HAIs in those countries, as these can have significant implications for their healthcare systems. This emphasizes the need for further research to identify gaps and needs.

HAIs in patients undergoing surgical procedures continue to raise questions, particularly those that are not SSIs. More research is required, especially in developing countries, to anticipate and recognize the complications that can arise from these infections. These complications include prolonged hospital stays, increased healthcare costs, and increased morbidity and mortality.

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CASE REPORT Doi: 10.18004/sopaci.2023.agosto.34

Pseudopapillary tumor of the pancreas. A case report

Tumor pseudopapilar de páncreas. Reporte de un caso

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SUMMARY
The pseudopapillary tumor accounts for 1 to 2% of all exocrine neoplasms of the pancreas. It has a higher incidence in young women and grows slowly. We present the case of a 41-year-old female patient with a history of 4 weeks of pain in the epigastrium and right hypochondrium, along with nausea and vomiting, without jaundice or weight loss. She underwent laparoscopic corporocaudal pancreatectomy.

Keywords: Cystadenocarcinoma, Frantz tumor, pancreatic cyst.

RESUMEN
El tumor pseudopapilar representa el 1 a 2% de todas las neoplasias exocrinas del páncreas. Tiene mayor incidencia en mujeres jóvenes y es de crecimiento lento. Se presenta el caso de paciente de sexo femenino, de 41 años, con antecedente de dolor de 4 semanas de evolución, a nivel de epigastrio e hipocondrio derecho, náuseas y vómitos sin ictericia ni pérdida de peso, sometida a pancreatectomía corporocaudal laparoscópica

Palabras claves: Cistoadenocarcinoma, tumor de Frantz, quiste de páncreas.

INTRODUCTION

Solid pseudopapillary tumor of the pancreas is one of the less common neoplasms among the exocrine tumors of this gland. It was first described by Frantz in 1959 as a papillary tumor of the pancreas. In 1996, the WHO renamed it as SPT within the international histological classification of tumors.[1]

It comprises only 0.2 to 2.7% of all pancreatic tumors. Its etiology is uncertain, and it occurs in young women between 18 and 40 years of age. The clinical manifestation is a slowly growing abdominal mass without abdominal pain. Its preferred location is the tail of the pancreas, followed by the body.[2] They have low malignant potential; however, some cases can be locally aggressive and invasive, with metastases to the liver, lungs, and skin.[3]

The imaging characteristics of Frantz's tumor include solid and cystic components, intratumoral hemorrhage, fibrous capsule with degenerative changes, and occasionally calcifications. These features make it possible to differentiate this tumor from other pancreatic tumors.[4] The classical histological pattern consists of papillary tumor cells composed of a fibrovascular stalk surrounded by several layers of epithelial cells that contain small blood vessels, thus forming pseudopapillae.[5]

CASE PRESENTATION

A 41-year-old female patient presented with a 4-week history of pain in the epigastrium and right hypochondrium, described as heaviness of moderate intensity, radiating to the right dorsal region. She also reported general fatigue, nausea, and vomiting on several occasions with liquid content; no weight loss, fever, or jaundice was reported. She mentioned similar episodes of pain over the past 14 years, which were relieved by common analgesics, and she had undergone conventional cholecystectomy 7 years ago. Physical examination revealed a globular, asymmetric abdomen due to Kocher subcostal and Pfannenstiel scars; the abdomen was soft, depressible, mildly painful on deep palpation in the periumbilical region, where an approximately 6 x 10 cm poorly defined solid elastic tumor was palpable, with its edges extending under the costal margin, showing pre-tumoral resonance, no movement with respiration, and no changes with Valsalva maneuvers.

Laboratory analyses showed: hemoglobin 13.3 g/dL, hematocrit 39%, glucose 262 mg/dL, Hb1Ac 9.3%, normal liver function tests, alpha-fetoprotein 1.26 ng/mL, CEA 1.8 ng/mL, CA 15-3 7 U/mL, CA 125 13 U/mL.

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The ultrasound report indicated: a hypoechoic solid nodular tumor with regular borders, measuring 72 x 76 mm, located in the projection of the pancreatic tail with extension towards the splenorenal space; peripheral and central vascular signals were observed on color Doppler. No dilatation of the common bile duct was noted.

Contrast-enhanced CT revealed a lobulated rounded mass in the projection of the body and tail of the pancreas, measuring approximately 11 x 8 x 7 cm. The mass showed predominantly peripheral thick calcifications, heterogeneity, cystic appearance, and areas of higher density; internal papillae were indiscernible. No contrast enhancement was observed in arterial, portal, or delayed phases. No perilesional lymphadenopathies were noted ***(Figure 1)***. The report suggested complementing with MRI to better determine the intracystic characteristics of the tumor.

MRI findings expressed an oval-shaped polylobulated mass at the level of the pancreatic tail, measuring 125 mm transverse diameter, 84 mm anteroposterior diameter, and 84 mm in height. The mass exhibited irregular peripheral enhancement with irregular contrast uptake in intralesional areas, possibly corresponding to internal pseudopapillae ***(Figure 2).***

The surgical procedure performed was a laparoscopic corporocaudal pancreatectomy with splenectomy: a tumor measuring 12 x 8 x 8 cm was found in the body and tail of the pancreas, with no macroscopic lymph node involvement; it was firmly adhered to the splenic vein, which appeared thrombosed. The surgical time was 4 hours ***(Figure 3)***.

The pathology report indicated: epithelial tumor with medium-sized polygonal cells, eosinophilic cytoplasm, and mildly atypical central nuclei; they were arranged in solid or cystic areas with hemorrhage or pseudopapillary patterns. The cells were strongly positive for vimentin and CD56, with additional areas staining with B-catenin and partially with CD10. No vascular invasion of the splenic vein was observed.

The patient had a favorable postoperative course in the initial days. On the fifth day, she developed a low-output pancreatic fistula that was managed with nutrition and antibiotic therapy. Spontaneous closure occurred on the twelfth postoperative day, which was also the date of her discharge.

DISCUSSION

The pseudopapillary tumor of the pancreas is characterized by slow growth. In this patient's case, the tumor was not noticed in preoperative studies conducted prior to a conventional cholecystectomy 7 years ago.1 The tumor has low malignant potential but can metastasize in 15% of cases, especially in patients with poor prognostic criteria such as male gender and advanced age.

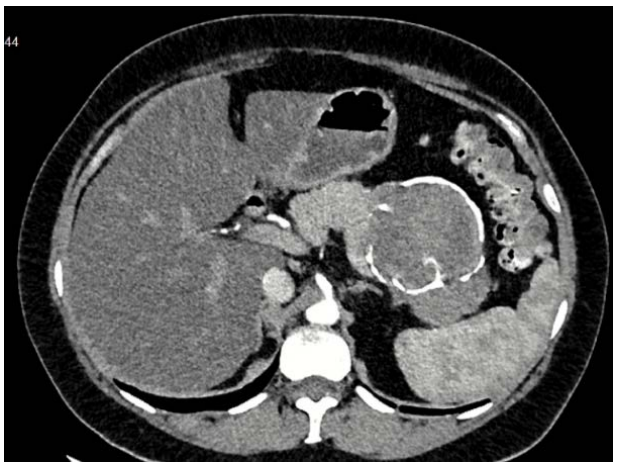

Figure 1. Abdominal CT scan. Heterogeneous image with lobulated contours and calcifications.

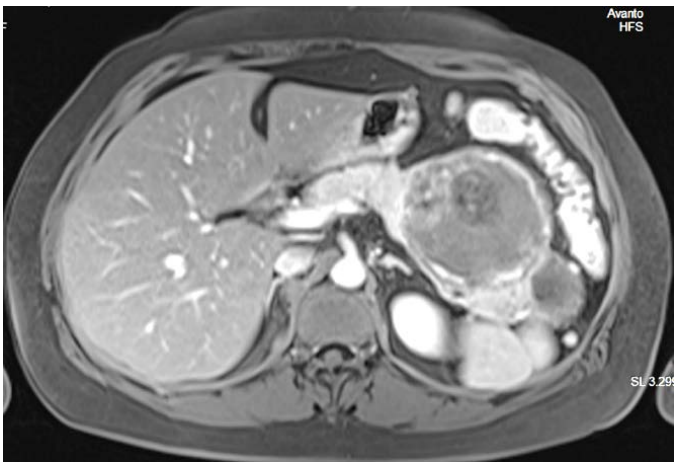

Figure 2. Abdominal MRI image of a rounded mass with lobulated contours, measuring approximately 11 x 8 x 7 cm.

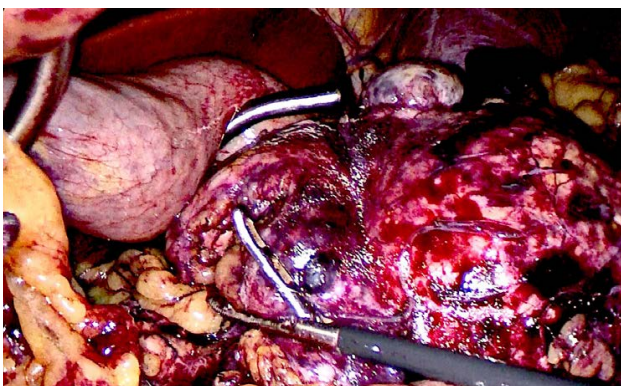

Figure 3. Tumor measuring 12 x 8 x 8 cm located in the body and tail of the pancreas, without macroscopic lymph nodes.

[6] Size is not indicative of poor prognosis; in this patient, despite the 12 cm size, curative surgery was proposed.

The performed surgery was a corporocaudal pancreatectomy. The laparoscopic approach was used due to the patient's age and absence of poor prognostic signs.3 Macroscopically, there appeared to be involvement of the splenic vein, leading to a combined splenectomy to reduce the 15% risk of metastasis mentioned earlier, although this was ruled out by pathological anatomy.[2,6]

The laparoscopic approach is safe in these patients, providing satisfactory oncological margins, improving postoperative recovery by reducing complications associated with large abdominal incisions, and maintaining a reasonable surgical time.

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Authors' contributions: MAAW contributed to data collection and analysis for the work; literature search, writing of the work, critical review and final approval; and agrees to be accountable for all aspects of the work to ensure that issues related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. RA contributed to conception or design of the work, data collection and analysis for the work; literature search, writing of the work, critical review for important intellectual content, and final approval.

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CASE REPORT Doi: 10.18004/sopaci.2023.agosto.37

Exeresis surgery on the external region of the leg - anatomical repairs

Cirugía de exéresis sobre la región externa de la pierna - reparos anatómicos

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ABSTRACT

The presented case corresponds to a patient with a low-grade soft tissue tumor measuring 5 cm in the upper third of the right leg, on the lateral side. The surgical approach involved an appropriate wide resection. In relation to the study's objective of correlating the surgical approach for resecting a soft tissue tumor located on the outer side of the upper third of the leg with the anatomical compartmental and extracompartmental elements of the leg, an anatomical dissection was performed in the Descriptive Anatomy Department, focusing on the elements of the lateral compartment of the leg. During this dissection, the following structures were identified: the peroneal muscles, the lateral branch of the common peroneal nerve or external sciatic nerve, their relationships with the head of the right fibula, and their branches - the superficial and deep peroneal nerves.

Keywords: Anatomical dissection, compartmental elements.

RESUMEN

El caso presentado corresponde a una paciente con un tumor de partes blandas del tercio superior de la pierna derecha, cara externa; de bajo grado de 5 cm. cuya cirugía tuvo un enfoque de resección amplia adecuada. En relación con el objetivo del trabajo de relacionar el abordaje quirúrgico de la resección de un tumor de partes blandas ubicado en la cara externa del tercio superior de la pierna con los elementos anatómicos compartimentales y extra compartimentales de la pierna, fue realizada una disección anatómica en la Cátedra de Anatomía descriptiva haciendo énfasis en los elementos del compartimiento lateral de la pierna, en donde fueron identificados: los músculos peroneos, la rama externa del nervio ciático externo o peroneo común, sus relaciones con la cabeza del peroné lado derecho y sus ramas: nervios peroneo superficial y profundo.

Palabras Clave: Disección anatómica, elementos compartimentales

INTRODUCTION

Soft tissue sarcomas account for about 1% of all adult cancers, but this proportion increases to nearly 10% in children under 15 years old. These tumors constitute a heterogeneous group of neoplasms with still relatively unknown etiology. The overall survival of patients with soft tissue and connective tissue sarcomas is around 50% at five years after treatment initiation, with tumors located in the extremities having a more favorable prognosis than those in other locations.[1]

As far as surgical treatment of sarcomas is concerned, it has dramatically changed over the last three decades. Forty years ago (1970-1980), it involved radical surgery with resection of the entire muscular compartment or amputation of the limb. Nowadays, limb-sparing surgery can be performed in over 80% of cases. In oncological surgery, the objectives of surgical resection are complete removal of the tumor with wide margins and minimal functional compromise, avoiding postoperative sequelae or morphological deformities.

A proper understanding of anatomical elements allows for approaching a topographical region or performing a compartmental or extracompartmental surgery, considering anatomical relationships mainly with the vasculonervous axis, bony structures, and other adjacent tissues.

The specific objective of this study is to identify landmarks and anatomical elements of the external compartment of the upper third of the leg, both in anatomical dissection and in surgery, with an emphasis on the course of the external sciatic or common peroneal nerve, as well as its bony and muscular relationships, and the identification of its branches.

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Figure 1. Soft tissue tumor on the outer side of the upper third of the right leg.

CASE PRESENTATION

A 68-year-old patient presented to a surgical service with a complaint of pain on the outer side of the upper third of the right leg, persisting for 6 months.

Physical examination revealed a slightly immobile soft tissue tumor. Further extension studies, including ultrasound and CT scans, were conducted, along with a percutaneous biopsy confirming the diagnosis of a soft tissue tumor on the outer side of the upper third of the right leg. A compartmental surgery was performed, preserving the common fibular nerve and using the head of the fibula as a landmark ***(Figures 1 and 2)***. The anatomopathological diagnosis reported a soft tissue tumor with clear margins. ***Figure 3*** shows the cadaveric dissection of the common fibular nerve.

DISCUSSION

For a low-grade tumor in a patient, surgery and proper dissection of the region are crucial, with a conservative approach to the lower limb and the identification of important vasculonervous elements in the region, considering aesthetics, gait, and patient prognosis.[1-2] In the specialized literature, great importance is given to compartmental and wide-margin surgery.[3] The treatment of a soft tissue tumor is dependent on the lesion size[4-5] and anatomical compartment of the areas,[7-8] and the patient's follow-up through regular physical examinations and imaging studies must also be considered.

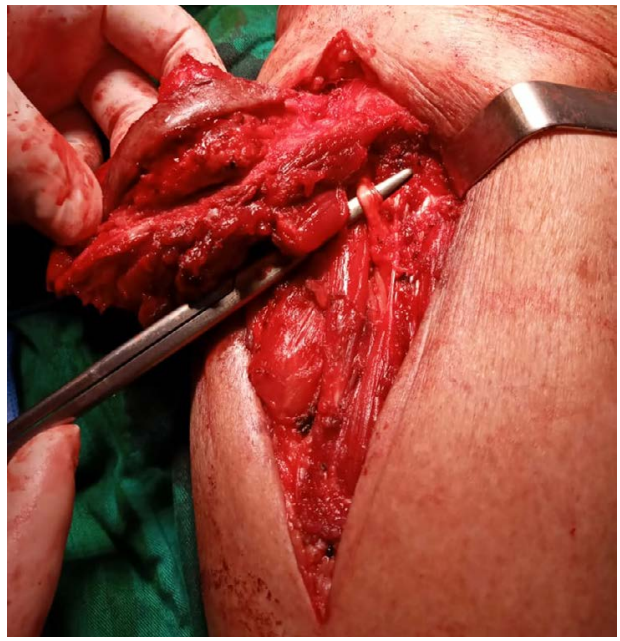

Figure 2. Common fibular nerve (external popliteal nerve), identifying the head of the right fibula.

Figure 3. Cadaveric dissection of the upper third of the right leg. Common fibular nerve (external popliteal nerve) and its branches in relation to the peroneal muscles.

Conflict of interest: No conflicts of interest.

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Ethical considerations: This research adheres to the Nuremberg Code and the Declaration of Helsinki.

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Bilateral synchronous parathyroid carcinoma: a case report

Carcinoma de paratiroides sincrónico bilateral: a propósito de un caso

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ABSTRACT
Parathyroid carcinoma (PC) is a rare endocrine neoplasm that most commonly occurs in patients with primary hyperparathyroidism, with an incidence of 0.5-4% among patients treated surgically for primary hyperparathyroidism. The diagnosis of PC is challenging as it clinically, radiologically, and histologically overlaps with parathyroid adenoma/hyperplasia. Diagnosis is based on clear evidence of local tissue invasion and/or metastasis. Bilateral PC is rare, and the primary treatment is surgical resection.

Key words: Bilateral synchronous parathyroid carcinoma, diagnosis, treatment.

RESUMEN
El carcinoma de paratiroides (CP) es una neoplasia endocrina poco frecuente, ocurre con mayor frecuencia en pacientes con hiperparatiroidismo primario, con una incidencia del 0,5-4% de los pacientes tratados quirúrgicamente por hiperparatiroidismo primario. El diagnóstico de CP es difícil porque se superpone clínica, radiológica e histológicamente con adenoma/hiperplasia de paratiroides, se basa en la evidencia de invasión tisular local inequívoca y/o metástasis. El CP bilateral es anecdótico y el principal tratamiento es la resección quirúrgica.

Palabras clave: carcinoma de paratiroides bilateral, diagnóstico, tratamiento.

INTRODUCTION

Parathyroid carcinoma (PC) is a rare neoplasm, with fewer than 1000 cases reported in the literature since its description by De Quervain in 1904. With an estimated prevalence of 0.005% of all cancers, PC is the rarest endocrine cancer, representing 0.5 to 5% of all cases of primary hyperparathyroidism.[1]

Parathyroid carcinoma occurs equally in both sexes, with an average age of onset between 54 and 56 years.[2] PC typically presents as an indolent and slowly progressive course. Most patients present with signs and symptoms of primary hyperparathyroidism and hypercalcemia, including nephrolithiasis, nephrocalcinosis, osteopenia, pathological fractures, gastrointestinal disturbances, fatigue, and depression.[3] Most cases of parathyroid carcinoma are unilateral. Bilateral cases are exceptionally rare, especially in patients without a history of long-term hemodialysis.[1-2] We present a case of bilateral parathyroid carcinoma without a history of hemodialysis.

CLINICAL CASE

A 63-year-old male patient presented with recurrent nephrolithiasis and renal colic for 3 years prior to consultation. Laboratory data showed PTH 522 pg/ml, total calcium: 13 mg/dl, and calciumuria of 650 mg/24h. Cervical ultrasound revealed two mixed nodular images with cystic areas located behind and below the lower pole of each thyroid lobe, suggestive of parathyroid adenomas. The right side measured 4.5 x 2.5 x 1.6 cm, and the left side measured 4.4 x 2.3 x 2.3 cm. Thyroid nodules classified as Thyroid Imaging Reporting and Data System (TI-RADS) 3 were detected in the right thyroid lobe. The patient expressed a preference for a less invasive method than surgery and received percutaneous ethanol injection for both parathyroid glands. Two months later, laboratory data showed PTH 504 pg/ml, total calcium 12.4 mg/dl, and calciuria 858 mg/24h.

A single-photon emission computed tomography (SPECT) scan with sestamibi revealed a positive gammagraphic pattern for two lower left parathyroid adenomas. ***(Figure 1)***

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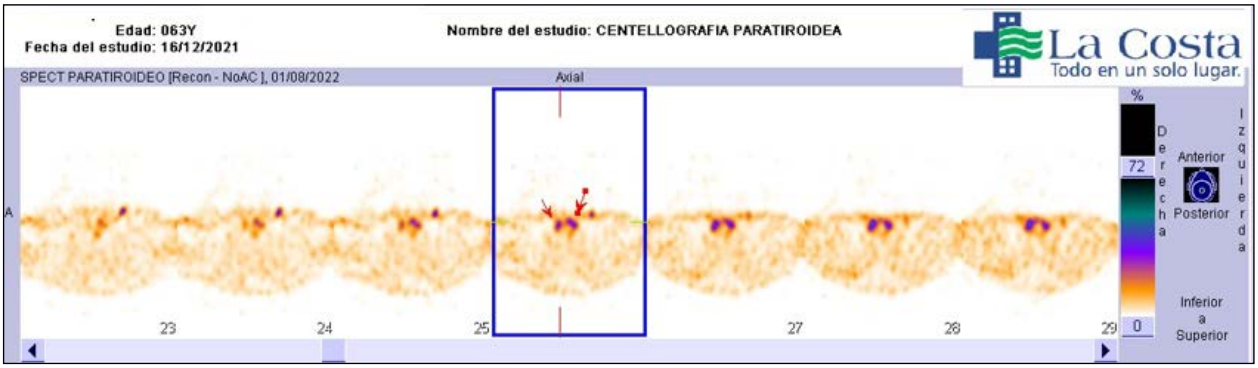

Figure 1. SPECT with sestamibi.

An ultrasound study indicated an enlarged right thyroid lobe. Additionally, a mixed cystic nodule with regular borders measuring 28 x 21 mm was observed, along with a hypoechoic solid nodule with irregular borders (29 x 17 mm) in the postero-inferior zone and delimited by the thyroid, compatible with a parathyroid nodule. The left thyroid lobe exhibited a mixed nodule measuring 13 mm with regular borders. In the left postero-inferior zone, delimited by the thyroid, another mixed hypoechoic nodule with regular borders measuring 47 x 21 mm was observed, also compatible with a parathyroid nodule. The diagnosis was multinodular goiter and bilateral lower parathyroid nodules. Total thyroidectomy with bilateral parathyroidectomy and resection of bilateral macroscopically lymph nodes at level VI was performed.

Pathological findings showed: 1) Solid right parathyroid tumor measuring 2.5 cm. Microscopically, it was a low-grade infiltrative parathyroid carcinoma, adhered to the thyroid, with extensive stromal fibrosis and capsular invasion ***(Figures 2 and 3)***. 2) Solid left parathyroid tumor measuring 1.1 cm. Microscopically, it was a low-grade parathyroid carcinoma with fibrosis and capsular invasion ***(Figures 4 and 5)***.

The thyroid gland showed changes consistent with benign multinodular goiter. Regional left (4) and right (2) lymph nodes showed no evidence of metastatic carcinoma.

It was classified as a bilateral low-grade parathyroid carcinoma. TNM staging (8th AJCC edition): Right side T2N0M0 and left side T1N0M0.

One month postoperatively, PTH was 4 pg/ml, total calcium was 8.8 mg/dl, no calcium was detected in urine; at the 10-month follow-up, PTH was 3 pg/ml, total calcium was 9.2 mg/dl (January 2023). The patient remains under active surveillance with no evidence of recurrence.

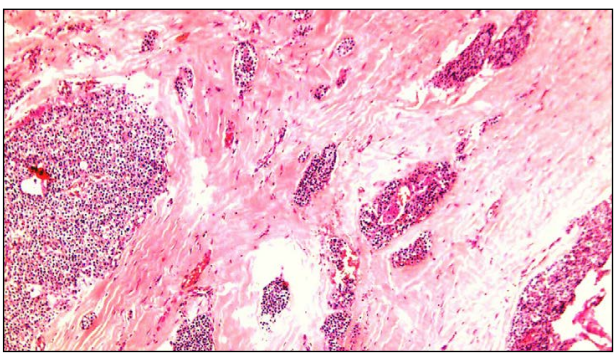

Figure 2. Low-grade parathyroid carcinoma. On the left, solid tumor composed of small cells. In the center and on the left, a thick fibrous capsule with nests of infiltrating carcinoma.

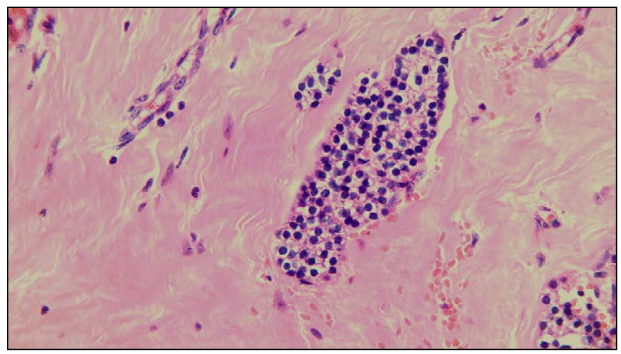

Figure 3. Nest of well-differentiated low-grade carcinoma, round non-atypical cells, without mitosis, indistinguishable from an adenoma except for its infiltrative nature.

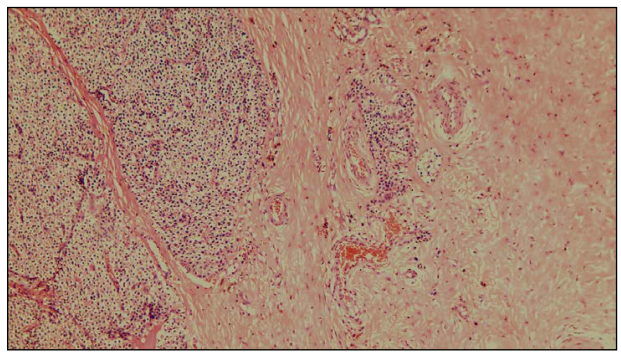

Figure 4. Low-grade parathyroid carcinoma. On the left, solid tumor composed of small cells with irregular borders. In the center and on the left, a thick fibrous capsule with infiltrative nests.

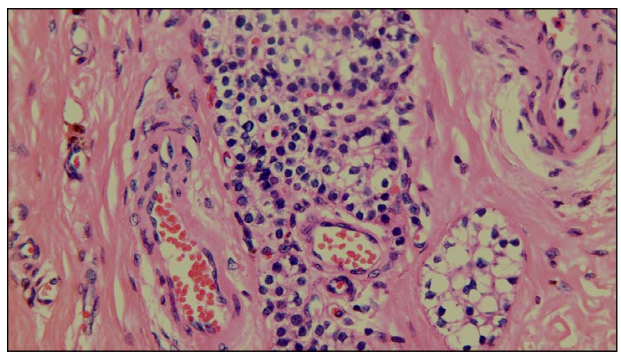

Figure 5. Infiltrative nests of carcinoma, with minimal nuclear atypia, absence of mitosis, peritumoral fibrosis.

DISCUSSION

Diagnosis of CP is challenging due to its clinical, radiological, and histological overlap with parathyroid adenoma/hyperplasia, and only unequivocal evidence of local tissue invasion and/or metastasis confirms the diagnosis. However, a higher frequency of hypercalcemia symptoms; palpable neck mass; PTH levels exceeding 500 pg/ml; and total calcium levels above 14 mg/dl are suggestive of carcinoma.4 The preferred imaging studies for localization are neck ultrasound and sestamibi scintigraphy.[4]

The etiology of CP remains unknown, and there is no evidence of transformation from pre-existing lesions. Nonetheless, there is an increased risk of parathyroid carcinoma in patients with other endocrine neoplasms such as isolated familial hyperparathyroidism and multiple endocrine neoplasia type 1. Several genetic mutations have been proposed in CP, including retinoblastoma (RB), P53, cyclin D1/gene 1 of parathyroid adenomatosis (PRAD1), and BRCA2.[5]

Surgery remains the only intervention offering the potential for curing parathyroid carcinoma. The primary goal of treatment should be complete removal of parathyroid cancer with negative margins. This includes en bloc resection of the primary lesion, ipsilateral thyroid lobectomy, isthmectomy, tracheal skeletonization, and excision of any adherent muscles. Central lymph node dissection is not indicated prophylactically.[6]

Ultrasound-guided percutaneous ethanol injection therapy can reduce calcium and PTH levels by up to 45% in parathyroid adenomas, although studies in carcinomas are not well-established.[7]

While parathyroid adenomas tend to be soft, oval, and reddish-brown in appearance, carcinomas tend to be larger (> 3 cm), white-gray, lobulated, and have a dense fibrous capsule. Adherence or invasion of adjacent structures suggests malignancy. Histological characteristics of parathyroid carcinoma described by Shanz and Castelman include sheets or lobules of tumor cells separated by dense fibrous bands, mitotic figures, necrosis, capsular invasion, and vascular invasion.[8]

Unfortunately, these classical pathological features are not always present in parathyroid carcinoma. Additionally, some of these characteristics, particularly mitotic figures and trabecular architecture, can also be observed in parathyroid adenomas.[9] They are categorized as low or high grade based on pleomorphism, nuclear size variation, prominent nuclear membranes, features closer to or distant from adenomas.[10]

Recent reports have recommended postoperative radiation therapy as a strategy to optimize local control, as it appears to effectively reduce local recurrence rates and improve disease-free intervals. However, due to the rarity of the disease, there are no prospective randomized trials, and most of the knowledge so far comes from case reports and small retrospective series, making the role of adjuvant radiotherapy after surgery still unclear.[1,11]

Chemotherapy has not been shown to improve survival, disease-free period, or correct hypercalcemia in patients with disseminated or unresectable disease.[12]

The AJCC 8th edition tumor classification uses the TNM system for staging; however, there is no specific clinical staging. Complete en bloc tumor resection can achieve survival rates of up to 90% at 5 years and 67% at 10 years.11 Negative prognostic factors include lymph node metastasis at the time of diagnosis, distant metastasis, non-functioning carcinomas, tumor size, high mitotic rate.[10]

Despite the best efforts, a significant proportion of patients experience recurrence. Recurrence rates of 33% to 78% have been reported in published studies. Most recurrences will manifest within the first 3 years, but recurrences up to 20 years have been reported. Once the disease has recurred, chances of cure are remote.[13]

To our knowledge, this is the first reported case of synchronous bilateral parathyroid cancer in Paraguay.

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Left renal vein transposition

Transposición de la vena renal izquierda

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ABSTRACT
Nutcracker syndrome caused by aorto-mesenteric compression of the left renal vein can be treated with surgical transposition. A review of this treatment was carried out at the Instituto de Previsión Social. Two women aged fifteen and twenty-six, who had low back pain and hematuria, were identified. They were discharged on the fourth and fifth postoperative day. The patients showed no symptoms after five and nine months of follow-up.

Keywords: Nutcracker Syndrome. Left renal vein transposition.

RESUMEN
El Síndrome de Nutcracker producido por compresión aorto-mesenterica de la vena renal izquierda puede tratarse con transposición quirúrgica. Se realizó revisión de dicho tratamiento realizado en el Instituto de Previsión Social. Se identificaron dos mujeres de 15 y 26 años, que presentaron dolor lumbar y hematuria. Egresaron al cuarto y quinto día de postoperatorio. Las pacientes no presentaron síntomas a los cinco y nueve meses de seguimiento.

Palabras claves: Síndrome de Nutcracker. Transposición de vena renal izquierda.

INTRODUCTION

The compression of the left renal vein by the aorto-mesenteric angle (aorta and superior mesenteric artery) was first described by Grant in 1937, who drew an analogy with a nutcracker.[1] The first clinical report of a patient with left renal vein compression syndrome, also known as nutcracker syndrome (NS), was made in 1950. The syndrome was described in a thin-built patient with little retroperitoneal fat, resulting in left renal ptosis with subsequent compression of the left renal vein.[2]

The pathophysiology of NS involves venous hypertension proximal to the site of compression of the left renal vein, leading to the development of varices in the renal pelvis that cause hematuria and left lumbar pain. Hematuria occurs due to the rupture of veins into the urinary collecting system. Other symptoms secondary to venous hypertension include varicocele in males, pelvic congestion syndrome in females, and orthostatic proteinuria.[3-5]

Numerous therapeutic procedures exist for treating these patients. Open surgical procedures include nephropexy, gonadal venous bypass, renal decapsulation, mesoaortic transposition, renal autotransplantation, and left renal vein transposition. Endovascular procedures used for treatment include transluminal angioplasty and stent placement in the left renal vein.[6-8]

The purpose of this study is to report the outcomes of patients with severe NS symptoms refractory to medical treatment who were treated in a Vascular Surgery Department.

CLINICAL CASE PRESENTATION

Data were collected from patients diagnosed with NS and treated in the Vascular Surgery Department of the Central Hospital of the Instituto de Previsión Social (HC-IPS) during the period from January 1st to December 31st, 2022. The HC-IPS electronic system (SIH) was used to collect data, including sex, age, laboratory tests, imaging studies (ultrasound, angioCT), urological studies (cystoscopy and ureteroscopy), surgical procedure performed (operative time, intraoperative bleeding, surgical

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technique, renal vein clamping time, length of hospital stay, and complications). Follow-up was conducted through reviewing patient records in the electronic system and telephone calls.

Patients underwent clinical evaluation, complemented with abdominal ultrasound in cases of abdominal pain, followed by abdominal angiotomography using a 64-slice multidetector CT scanner and Maximum Intensity Projection (MIP) reconstruction with arterial and venous phases for better identification of renal veins. Hematuria was assessed using cystoscopy and ureteroscopy.

The surgical procedure used was left renal vein transposition ***(Figure 1)***. General anesthesia was administered for the procedure. A midline laparotomy incision was made, and access to the inferior vena cava (IVC) and left renal vein was obtained transperitoneally by incising the retroperitoneum to the left of the root of the mesentery. Systemic heparinization with unfractionated heparin at a dose of 100 IU per kilogram of the patient's weight was administered before renal vein clamping. Clamping of the left renal vein and partial clamping of the IVC were performed. The IVC was sutured with 6/0 polypropylene. To mobilize the left renal vein, the left suprarenal vein was ligated, and the left gonadal vein was ligated only if necessary. The anastomosis of the left renal vein was performed 3 cm below its ostium.

Two patients with left renal vein compression syndrome or NS were identified between January 1st and December 31st, 2022.

Case 1 involved a 15-year-old female patient with a prior clinical history of severe abdominal pain. The patient was referred to HC-IPS with a probable diagnosis of left kidney stones, where abdominal ultrasound was performed after clinical evaluation. The ultrasound ruled out kidney stones as the cause of the pain and showed Doppler signs of possible compression of the left renal vein. Abdominal angiotomography ***(Figure 2)*** was performed, confirming compression of the left renal vein by the aorto-mesenteric angle during the venous phase. Left renal vein transposition (LRVT) was performed without complications ***(Figure 3)***. Surgical time: 130 minutes, left renal vein clamping time: 25 minutes. The patient was discharged on the fifth postoperative day without abdominal pain. Abdominal Doppler was performed on the ninth postoperative day, confirming a patent left renal vein with normal flow ***(Figure 4)***. The patient remained symptom-free at 9 months of follow-up.

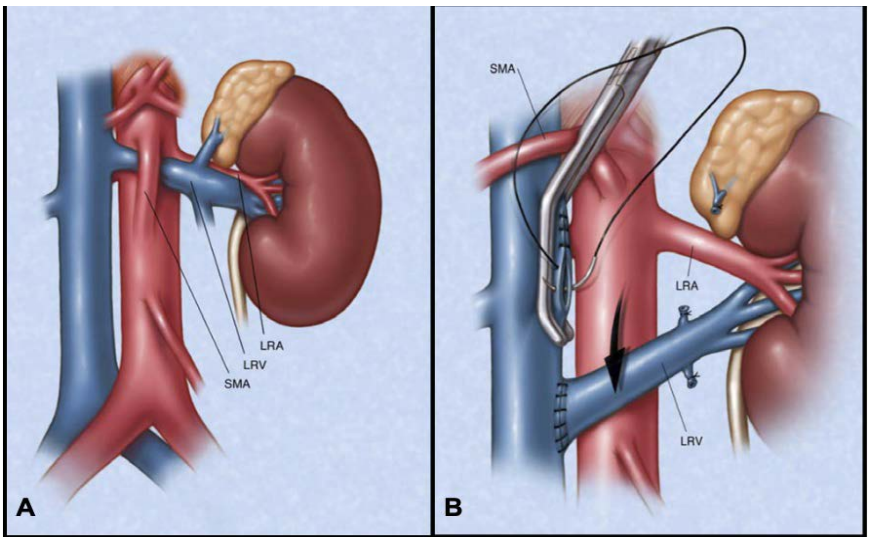

Figure 1. Aorto-mesenteric compression. Panel A: Compression of the left renal vein by the superior mesenteric artery. Panel B: Surgical schema of left renal vein transposition.
LRA: Left renal artery, LRV: Left renal vein, SMA: Superior mesenteric artery.
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Figure 2. Enhanced CT, venous phase. Compression of the left renal vein.

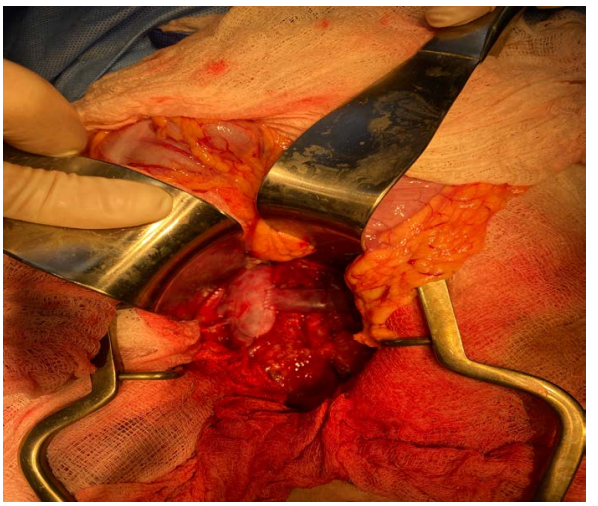

Figure 3. Anastomosis of the left renal vein.

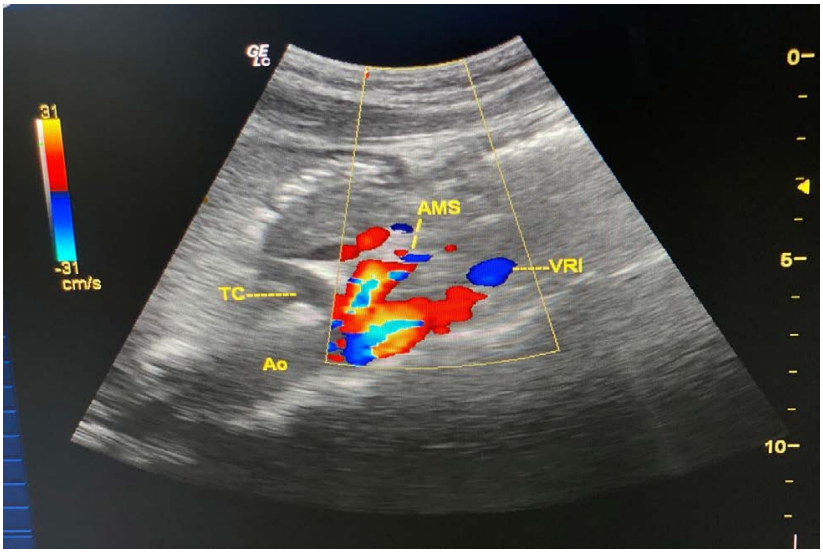

Figure 4. Abdominal Doppler. Patent left renal vein. LRV: Left renal vein, SMA: Superior mesenteric artery, Ao: Aorta.

Figure 5. Left renal vein compression and staghorn calculus in the left kidney.

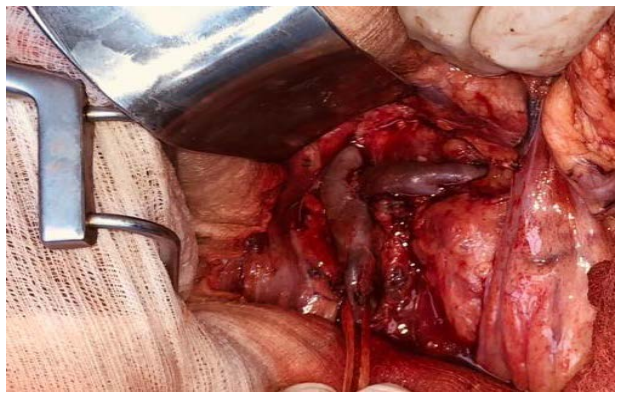

Figure 6. Left renal vein anastomosis.

Case 2 involved a 26-year-old female patient who presented to HC-IPS with severe hematuria without hemodynamic impact, but requiring transfusion of 4 units of packed red blood cells. Studies were conducted to determine the cause of the hematuria. Cystoscopy revealed abundant clots without identifying the cause. Ureteroscopy did not reveal the source of bleeding. Ultrasound revealed a staghorn calculus in the left kidney. Given the suspicion of NS, abdominal angiotomography was performed, confirming left renal vein compression by the aorto-mesenteric angle ***(Figure 5)***. The patient underwent LRVT, with a surgical time of 140 minutes and a left renal vein clamping time of 28 minutes ***(Figure 6)***. No postoperative hematuria was observed. The patient was discharged on the fourth postoperative day without complications. Follow-up revealed no recurrence of hematuria, and renal function was preserved at 6 months.

DISCUSSION

The diagnosis of NS is challenging due to the lack of absolute criteria. Patient evaluation should be comprehensive and multidisciplinary. The most common reasons for consultation are left lumbar pain, hematuria, and varicocele. NS typically presents in patients with a thin constitution and low body mass index (less than 25). Diagnosis is based on clinical findings, confirmed by ultrasound showing left renal vein compression, and further supported by abdominal angiotomography with arterial and venous phases and Maximum Intensity Projection reconstruction.[9-12]

Medical treatment is applied in cases with mild to moderate symptoms. Surgical treatment is indicated for severe cases unresponsive to medical therapy. According to the Argentine Intersociety Consensus on Pelvic Syndrome, medical treatment is recommended for at least twenty-four months in individuals under 18 years old and six months in those over 18 years, focusing on increasing body mass index.[13-14]

Endovascular treatment options include angioplasty and stent placement in the left renal vein, with reported technical success rates of up to 95%.[13-14]

Among the surgical options, left renal vein transposition (LRVT) is considered the best choice as it ensures renal function with a direct anastomosis to the inferior vena cava, ensuring a high patency rate. Reviewed literature indicates the best results in cases of hematuria and abdominal pain, with higher recurrence rates observed in cases of varicocele. Renal autotransplantation is a more complex surgery compared to LRVT.

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Author Contributions: All authors contributed equally to the preparation of this article.

Ethical Considerations: This research complies with the principles of the Nuremberg Code and the Declaration of Helsinki.

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1- PAGE- TITLE: The title must be clear, in Spanish; containing the maximum information with a minimum of words, it should not contain formulas, abbreviations, or question marks. It must be accompanied by the full name(s) of the author(s), fol-

lowed by their professional titles, correspondence address and email, as well as the name of the work institution. For original articles the number of authors will be a maximum of 10 (ten) and for brief notes and case reports a maximum of five.

2- SUMMARY - SUMMARY: A summary in Spanish and English must accompany the work, not exceeding 200 words. This summary must be structured as follows: objectives, material and method as well as results with their statistical significance and conclusion. The literal translation of the abstract should be avoided. Abstracts of review articles, clinical cases and technical notes do not need to be structured. However, your abstracts should not exceed 75 words.

3- KEY WORDS - KEY WORDS: According to Index Medicus indications (between 3 to 5 key words).

4- INTRODUCTION: You must indicate the objective of the work, the formulated hypothesis. The reason for the work. It is recommended to avoid extensive bibliographic reviews, history and anatomical bases.

5- MATERIAL AND METHODS: Characterizing the research, experiment or work carried out, duration, type of series or population studied and techniques used, providing sufficient details and following the ethical principles of the Helsinki declaration of 1975.

6- RESULTS: Reports of the observations made with the material and method used. These data can be expressed in detail in the text or in the form of tables and figures.

7- DISCUSSION: The author will try to offer his own opinions on the subject, highlighting among others: meaning and application of the results, considerations on the inconsistency of the methodology and the reasons for the validity of the results; relationship with similar publications: similarities and differences, indications for future research.

8- REFERENCES - BIBLIOGRAPHY: (According to Vancouver Standards) they will be numbered in order of appearance in the text. All bibliographic citations will be mentioned in the text by means of their corresponding Arabic number and no author will be mentioned who does not appear in said citations. Bibliographical references will be presented in the manner shown in the following examples: Journal articles and initials of all authors if there are six or less. Seven or more, only the first six will be required, followed by the expression et al.: Title of the work in original language: abbreviation of the name of the Journal according to its use by the Index Medicus: year of publication, volume and first page and last from work.

Book and monographs: Authors, book title, or monograph, city, publisher and year of publication. Book chapters: authors, chapter titles in the original language, surnames and initials of the editor(s), title of the book, city of publication, publisher, year of publication, and page (first and last of the chapter). The number of bibliographic citations should not exceed 20 (twenty) for original articles, 8 (eight) for clinical cases and 5 (five) for technical notes.

9- FIGURES: Illustrations, photographs, graphs and diagrams will be considered figures. The photographs will be carefully selected, ensuring that they are of good quality. The author must provide the original in high definition jpg format (300dpi). The photos will be published in black and white. When the publication of color photographs is desired, the expenses will be borne by the author, who will request a budget from the publisher. The editor of the magazine and the editorial committee reserve the right to reject, after informing the authors, those photographs that do not meet the necessary quality for a good reproduction. Each figure must have an explanatory title.

10- TABLES: They will be presented in sheets and will include: a) numbering of the table, b) statement (title) and c) a single table per sheet. They must be clear and without corrections.

The works that do not strictly comply with these conditions will be returned to their authors so that they can proceed to make the modifications that are suggested by this Journal.

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