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Comparison of the Adhesive Strength of Universal Systems with and without MDP on Dentin by Microblading

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Abstract

In dentistry today, evaluating adhesive strength is crucial for successful treatment with universal adhesive systems. This article considers the adhesive resistance to dentin micro bleaching of two universal adhesive systems with and without MDP. For this purpose, third molars (n=40), divided into two groups, were used without occlusal enamel using a low-speed bioactive diamond disc with cooling up to 4mm above the amelocemental line. The universal adhesive system with MDP was applied for group 1 (n=20), and the universal adhesive system without MDP for group 2 (n=20). A standardized resin cylinder of 2mm in diameter and 4mm in height was made for both groups using a silicone mold, placing it on the occlusal surface. Each group was divided into two subgroups, where (n=10) were subjected to thermocycling and (n=10) were not subjected to thermocycling, to subsequently perform the micro-shearing test using the Shimadzu AGS-X Universal Testing Machine. The data were analyzed by ANOVA test, stating that the groups with MDP showed significantly higher micro-shear values than those without MDP. This indicates that the MDP group's mean shear load value of the resin cylinders is higher than that in the non-MDP group.

Keywords: MDP, Microshear, Thermocycling, Universal Adhesive.

Comparación de la resistencia adhesiva de sistemas universales con y sin MDP en dentina mediante microcizallamiento

Resumen

En la odontología actual, la evaluación de la fuerza adhesiva es crucial para el éxito del tratamiento con sistemas adhesivos universales. Este artículo evalúa la resistencia adhesiva al microblanqueamiento dentinario de dos sistemas adhesivos universales con y sin MDP. Para ello se utilizaron terceros molares (n=40), divididos en dos grupos, sin esmalte oclusal utilizando un disco de diamante bioactivo de baja velocidad con enfriamiento hasta 4mm por encima de la línea amelocementaria. Se aplicó el sistema adhesivo universal con MDP para el grupo 1 (n=20), y el sistema adhesivo universal sin MDP para el grupo 2 (n=20). Se elaboró un cilindro de resina estandarizado de 2 mm de diámetro y 4 mm de altura para ambos grupos utilizando un molde de silicona, colocándolo en la cara oclusal. Cada grupo se dividió en dos subgrupos, donde (n=10) fueron sometidos a termociclado y (n=10) no sometidos a termociclado, para posteriormente realizar el ensayo de microcizallamiento utilizando la Máquina Universal de Ensayos Shimadzu AGS-X. Los datos se analizaron mediante la prueba ANOVA, indicando que los grupos con MDP mostraron valores de microcizallamiento

significativamente más altos que aquellos sin MDP. Esto muestra que el valor medio de la carga de cizallamiento de los cilindros de resina del grupo MDP es más alto que el del grupo sin MDP.

Palabras clave: MDP, Microcizallamiento, Termociclado, Adhesivo Universal.

Comparação da força adesiva de sistemas universais com e sem MDP sobre dentina por microblading

Resumo

Na odontologia moderna, a avaliação da força adesiva é crucial para o sucesso do tratamento com sistemas adesivos universais. Este artigo avalia a força adesiva para dentinar o microtreinamento de dois sistemas de adesivos universais com e sem MDP. Os terceiros molares (n=40), divididos em dois grupos, sem esmalte oclusal, foram utilizados para este fim usando um disco diamantado bioativo de baixa velocidade com resfriamento até 4mm acima da linha amelocemental. O sistema adesivo universal com MDP foi aplicado para o grupo 1 (n=20), e o sistema adesivo universal sem MDP para o grupo 2 (n=20). Um cilindro de resina padronizado de 2 mm de diâmetro e 4 mm de altura foi feito para ambos os grupos usando um molde de silicone e colocado no lado oclusal. Cada grupo foi dividido em dois subgrupos, onde (n=10) foram termociclados e (n=10) não foram termociclados, e então foram realizados testes de microcoração utilizando a Máquina Universal de Testes Shimadzu AGS-X. Os dados foram analisados pelo teste ANOVA, indicando que os grupos com MDP apresentaram valores significativamente mais altos de microcoração do que aqueles sem MDP. Isto mostra que o valor médio da carga de cisalhamento dos cilindros de resina no grupo MDP é maior do que o do grupo sem MDP.

Palavras-chave: Palabras clave: MDP, Microcisalhamento, Termociclagem, Adesivo Universal.

1. Introduction

The evolution of adhesive systems has focused on simplifying protocols, reducing application time and steps, thus reducing the possibility of errors in the application of these substances, as well as stimulating the creation of simpler adhesive systems [1]. However, the diversity of the tissues involved during a restorative process, the location of the cavity preparation, and the incidence of mainly occlusal forces lead us to wonder if these materials will have acceptable behavior over time on the dentin substrate, which is the most unpredictable tissue due to its structural morphology, humidity and pathological factors that can affect the adhesion and subsequent failure of the restoration [2], [3]. To avoid this type of problem, universal adhesives present functional monomers such as MDP that help with the acid etching of the dentin substrate, promote the penetration of the monomers, aid in wettability and cause an adhesive interaction with the tooth. However, their main advantage is their ability to chemically bond to demineralized hydroxyapatite, allowing greater longevity and less postoperative sensitivity [4], [5].

During the last few years, a great variety of clinical techniques have emerged, due to the immeasurable progress of dental materials and esthetic demands, which has allowed new adhesive results, reducing the clinical failures that occur especially in dentin, due to its morphophysiological differences, in comparison with dental enamel, which makes it difficult to achieve adequate adhesion. Loguercio [6] mentions that adhesives evolved from presenting a hydrophobic character to a hydrophilic one, capable of interacting with the dentin substrate, which is moist. However, [7] mentions that this is not the only limiting factor, since it also depends

on the adhesive technique, the operator's skill and the current state of the dentin, which can cause long-term degradation of the dentin-dentin interface and subsequent failure of the restorative treatment.

Functional monomers have been introduced in universal adhesives, which can be applied to the dentin structure without acid etching, avoiding excessive disorganization of the collagen fibers. MDP has excelled in maintaining adequate stability of the dentin-resin interface, being the most used monomer, and obtaining superior research results to other functional monomers [8]. Due to the importance of the data above, the choice of adhesive should be mediated under all the parameters above, so it is necessary to research to determine the bond indicated for each clinical situation. The evolution of adhesive systems has focused on simplifying protocols and decreasing the time and steps of application. This seeks to reduce the possibility of errors in applying these substances and stimulate the creation of simpler adhesive systems. However, the diversity of the tissues involved during a restorative process, the location of the cavity preparation, and the incidence of mainly occlusal forces lead us to wonder if these materials will have acceptable behavior over time on the dentin substrate, which is the most unpredictable tissue due to its structural morphology, humidity and pathological factors that can affect the adhesion and subsequent failure of the restoration [9], [10].

To avoid this type of problem, universal adhesives present functional monomers such as MDP that help with the acid etching of the dentin substrate, promote the penetration of the monomers, aid in wettability, and cause an adhesive interaction with the tooth [1]. However, their main advantage is their ability to chemically bond to demineralized hydroxyapatite, allowing for greater longevity and less postoperative sensitivity. Therefore, this research will enable us to compare the adhesive strength of two universal adhesive systems, one with MDP and the other without MDP, since at the time of making a direct or indirect restoration, the interaction of these adhesives with dental tissues, especially with dentin, is what generates a strong and durable bond over time, thanks to its chemical and mechanical bonding, so it is essential to obtain this data to identify the importance of this functional monomer to ensure the success of any treatment. In adhesion to dental tissues, universal adhesive systems containing MDP will present more excellent resistance to micro-shear than universal adhesive systems that do not have MDP [11].

This article consists of four sections, including the introduction in section 1. The methodology is presented in section 2, and the results in section 3.

2. Methodology

2.1. Type and design of research

An experimental study was carried out in vitro since the variables were subjected to manipulation under controlled conditions and comparative since it was determined whether there is a difference in the adhesive strength of a universal adhesive system with MDP and another without MDP, which was evaluated using micro-shear loads, in samples subjected to thermocycling and samples not subjected to thermocycling.

2.2. Participants

The sample size was established by convenience, considering that the minimum sample in vitro studies is 10, for which third molars (n=40) were used, divided into two groups, to which the universal adhesive system with MDP was applied for group 1 (n=20), and the universal adhesive system without MDP for group 2 (n=20). Each group was divided into two subgroups: (n=10) were subjected to thermocycling, and (n=10) were not.

2.3. Inclusion and Exclusion Criteria

Recently extracted third molars, healthy third molars, and third molars without fissures or fractures were considered for inclusion. Extracted third molars that had not been preserved in ideal conditions, third molars with coronary destruction, and third molars with restorations were excluded.

2.4. Data collection techniques and instruments

For the research, 40 recently extracted third molars donated by the surgical center of the Faculty of Dentistry of the Central University of Ecuador were used, with the patient's authorization through the application of an informed consent form attached to the respective medical records. The biological samples collected met the inclusion and exclusion criteria and were stored in a physiological saline solution until the time of the study.

2.5. Sample preparation

Each sample was cleaned with a 7/8 Gracey curette and stored in distilled water at 37ºC until submitted to the study. The occlusal enamel of each of the teeth was removed using a low-speed bioactive diamond disc with cooling up to 4mm above the amelocementary line. The exposed surfaces were polished with fine-grit water sandpaper to standardize the smear layer. Each sample was placed in self-curing acrylic specimens measuring 20 mm high by 20 mm long by 10 mm wide, up to the amelocemental limit, leaving the coronary portion free. Chlorhexidine 2% was applied to the exposed dentin surface to eliminate the metalloproteinases responsible for the degradation of the resin-dentin interface, and the feeling was dried with sterile paper swabs.

2.6. Classification of the samples

The third molars were divided into two groups of 20 each, and the adhesive was applied to each group according to the manufacturer's specifications, as follows:

2.6.1. Group 1: Adhesive with MDP

A micro brush was embedded with the adhesive, and two adhesive layers were applied to the slightly moist dentin surface. The first layer was applied by rigorously rubbing the adhesive with the micro brush for 10 seconds. In sequence, the second layer of adhesive was used for 10 seconds, and an air jet was applied to evaporate the solvent; finally, polymerization was performed with a GNATUS LED light lamp with a power of 1200mW/cm2 for 10 seconds.

2.6.2. Group 1: Adhesive without MDP

A drop of adhesive was dispensed on a micro brush and applied to the preparation, rubbing it gently for 10 seconds. The layer was thinned with air pressure for 10 seconds; finally, it was polymerized with a GNATUS brand LED light lamp with 1200mW/cm2 power for 10 seconds. The surface should look shiny.

The restoration of each group was carried out by making a resin cylinder of 2mm diameter x 4mm height, with micro-hybrid resin, in a silicone mold, with a titanium gutta-perch and compacted with an attacker with increments of 2 mm checked with a caliper and polymerized with a GNATUS LED light lamp with a power of 1200mW/cm2 for 40 seconds according to the manufacturer's instructions. Each group was divided into two subgroups of 10 each, which were subjected to thermocycling as follows:

- SUBGROUP A: Subjected to thermocycling.
- SUBGROUP B: Not subjected to thermocycling.

The corresponding groups were stored in distilled water at 37ºC for 24 hours, to be later subjected to temperatures of 55ºC and 5ºC, remaining 20 seconds at each temperature and 10 seconds to transfer from one temperature to another, considering this process as a cycle. Thus, the thermocycler subjected them to 500 cycles, equivalent to 6 months of artificial aging.

2.7. Preparation of samples to be subjected to micro-shearing tests

The specimens were taken to the Laboratory of Stress and Vibration Analysis of the National Polytechnic School to perform the micro-shear load tests in the Universal Testing Machine (SHIMADZU AGS-X) to determine the adhesive strength in each of the samples.

3. Results

Based on the 40 data provided by the Stress and Vibration Analysis Laboratory of the National Polytechnic School, they were divided into four groups with several ten samples each, as shown in Table 1.

Table 1. Sample identification.

Sample	LAEV Identification
Group A (Adhesive with MDP/without Thermocycling)	GA
Group B (Adhesive with MDP/with Thermocycling)	GB
Group C (Adhesive without MDP/without Thermocycling)	GC
Group D (Adhesive without MDP/with Thermocycled)	GD

According to report LAEV-M19.129, the shear strength was calculated according to the adhesive system used, considering the maximum load recorded. The area of incidence of the dental material (resin) was calculated in [MPa] units. The result is shown in Figure 1.

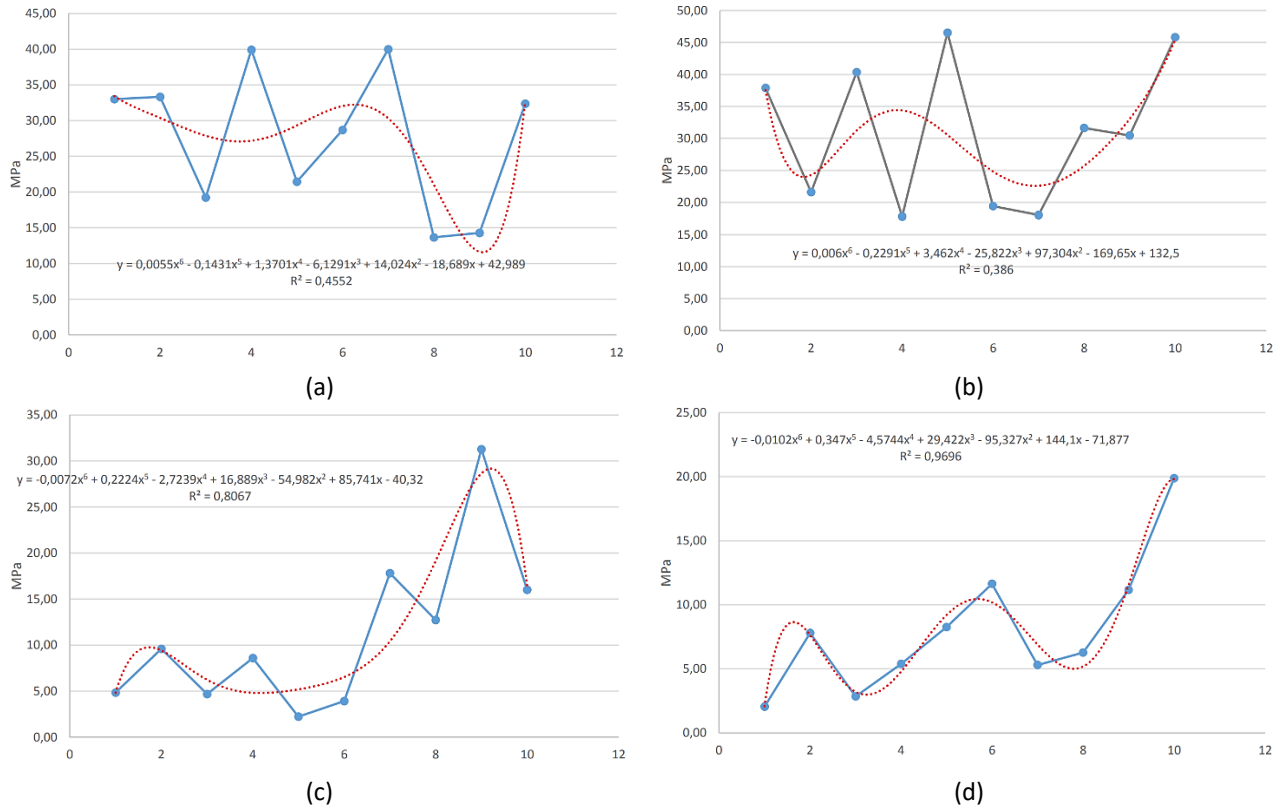

Figure 1. Distribution of shear strength data: a) group A; b) group B; c) group C; d) Group D.

According to Tukey's method, the check begins by verifying no extreme outliers, which refers to the difference between the first quartile (Q1) and the third quartile (Q3), called the interquartile range, which different circumstances can obtain. This can be seen in the box-and-whisker plot described in Figure 2. The shear strength data for each group were entered into a database in the IBM SPSS software version 22 to perform the descriptive and inferential statistics calculations.

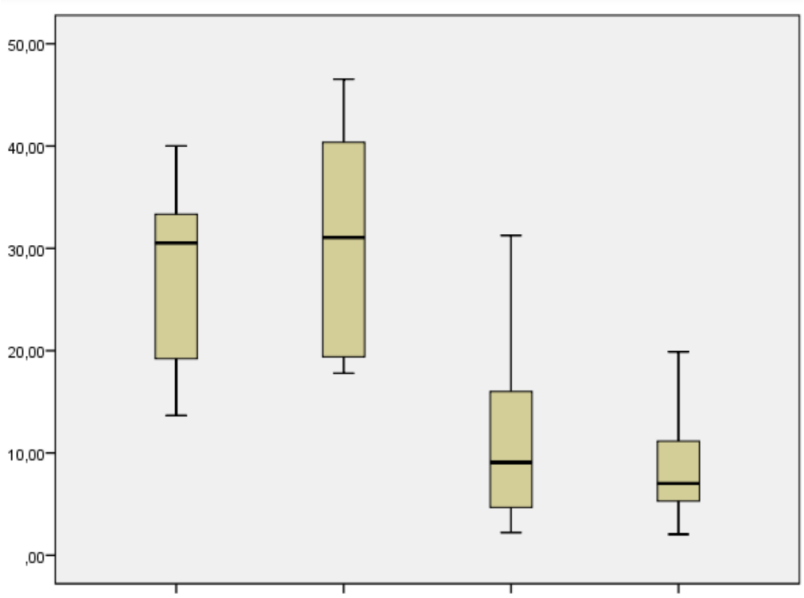

Figure 2. Shear strength in each group from left to right (A, B, C, D).

3.1. Normality and homogeneity test

Before performing the ANOVA statistical test, a normality test should be performed. The SHAPIRO-WILK test is chosen because it is effective when the sample size is less than or equal to 30. From the normality test, all groups A-B-C-D come from a population with normal distribution since they exceed the imposed significance level of 0.05, as shown in Figure 3.

The homogeneity of variances test is performed, that is to say, if the variances are equal or not, this will give the way to observe the significance in the post hoc tests, where it is analyzed between which groups the means are similar or not, assuming equal variances - TUKEY and if equal variances are not added - Games-Howell. Since the value is 0.052>0.05, equal variances are considered for post hoc tests by Tukey.

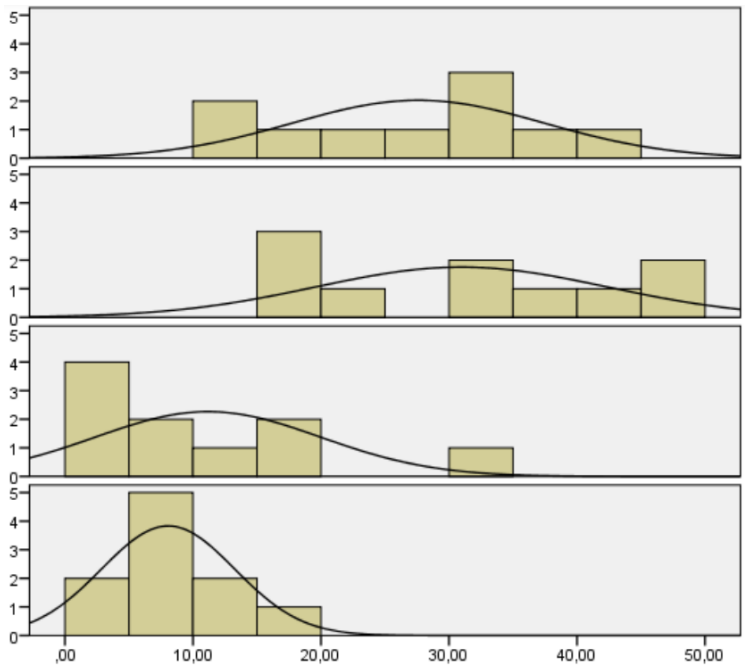

Figure 3. Histogram of data Group A-B-C-D showing the normality of the data.

3.2. One Factor ANOVA

There are significant differences between the means of all the groups. To observe which groups this difference exists, we will check with the POST HOC tests; in this case, we will use the TUKEY test. There is no significant difference between the shear stress means between group A and B; therefore, the shear stress means are equal; the same between C and D. Between A and C, it was evidenced that A has more significant shear stress, while between A and D, there is more substantial stress in D. Between B and C more significant stress was found in group B, as well as between B and D. All this can be better appreciated in Table 2.

Table 2. Significance test with ANOVA - POST HOC - TUKEY.

Group I	Group J	Difference between means (I-J)	Standard error	Sig.	95% confidence interval	
					Lower limit	Upper limit
GA	GB	-3.36300	4.06553	.841	-14.3124	7.5864
	GC	16.42900*	4.06553	.001	5.4796	27.3784
	GD	19.53900*	4.06553	.000	8.5896	30.4884
GB	GA	3.36300	4.06553	.841	-7.5864	14.3124
	GC	19.79200*	4.06553	.000	8.8426	30.7414
	GD	22.90200*	4.06553	.000	11.9526	33.8514
GC	GA	-16.42900*	4.06553	.001	-27.3784	-5.4796
	GB	-19.79200*	4.06553	.000	-30.7414	-8.8426
	GD	3.11000	4.06553	.870	-7.8394	14.0594
GD	GA	-19.53900*	4.06553	.000	-30.4884	-8.5896
	GB	-22.90200*	4.06553	.000	-33.8514	-11.9526
	GC	-3.11000	4.06553	.870	-14.0594	7.8394

As can be seen, some values of significance are lower and others higher than 0.05, which is the assumed error value, with a 95% confidence level. It is concluded that the highest shear strength values were those of Group A (Adhesive with MDP / without Thermocycling) and Group B (Adhesive with MDP / with Thermocycling). This can be seen from the graph between averages described in Figure 4 and Figure 5.

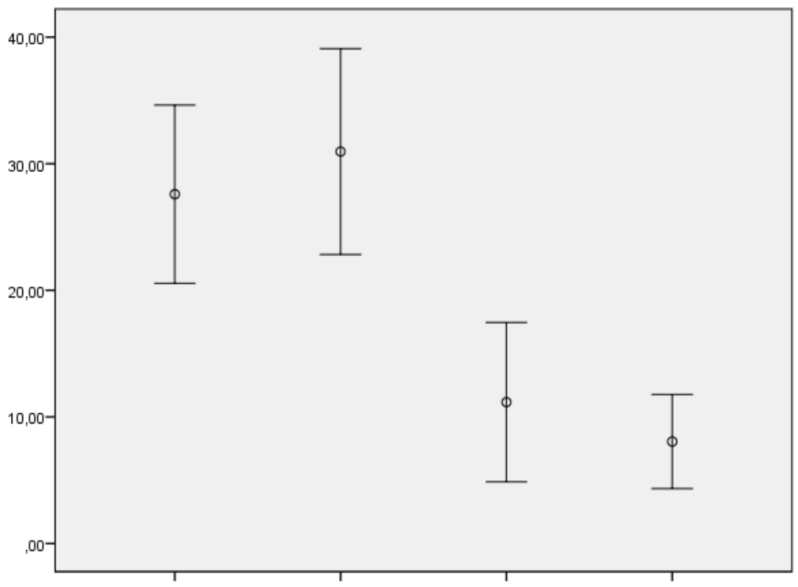

Figure 4. 95% CI shear strength in each group from left to right (A, B, C, D).

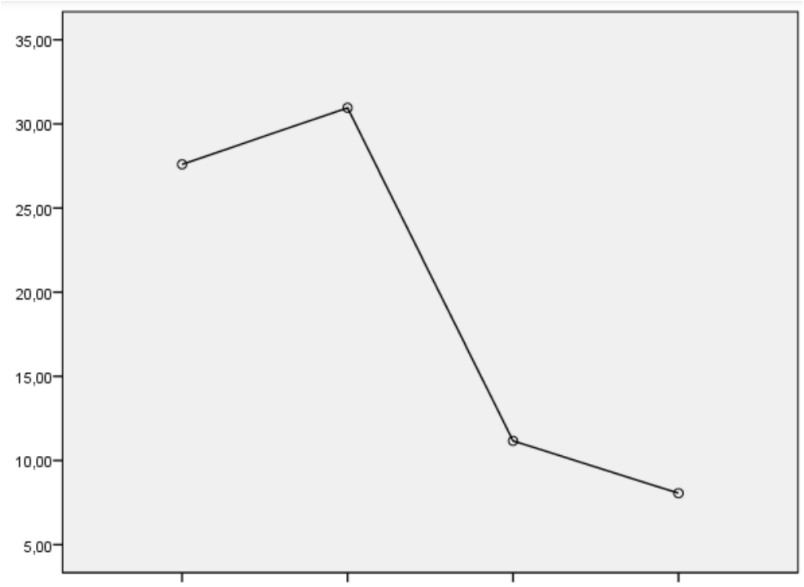

Figure 5. Mean shear strength in each group from left to right (A, B, C, D).

4. Discussion

In this study, a resin cylinder was built up on the exposed dentin surface of teeth. An adhesive with MDP was applied to one group that underwent thermocycling (Group B) and another that did not experience thermocycling (Group A). In addition, an adhesive without MDP was also applied to another group that was a thermocycler (Group D) and another that was not a thermocycler (Group C). Each sample was subjected to shear loading, and it was obtained that there is a statistically significant difference between groups A-B and C-D. Consequently, the research hypothesis is accepted, and the null hypothesis is rejected.

The bond strength of an adhesive to dentin depends on its composition, which can provide more excellent resistance and less microleakage, as is the case with universal adhesives that allow chemical bonding to dentin by incorporating functional monomers. MDP is the primary monomer present in most universal adhesive systems and is considered the Gold Standard for its effectiveness in durability and chemical interaction with dental tissues. However, pharmaceutical companies have experimented with other functional monomers with similar characteristics to MDP [9].

This study aimed to evaluate the shear bond strength of resin cylinders bonded with two types of adhesives, one with MDP and the other without MDP. Previous studies have assessed the adhesive force in dentin treated with 5.25% sodium hypochlorite by micro tensile testing, obtaining similar results between adhesives with different functional monomers. Other studies have evaluated various functional monomers, such as GPDM, using tensile testing for better immediate results. In addition, it has been determined that the self-etching technique is easier to use and reduces clinical failures in dentin. Due to its humidity, it presents difficulties in its handling, especially in the acid wash, causing the drying of the dentin and deterioration of the adhesive forces. Therefore, in this study, the self-etching technique was used [8].

5. Conclusions

This study showed that the bond strength of an adhesive to dentin is highly dependent on its composition, particularly the presence of functional monomers such as MDP. It was found that the adhesive with MDP presented a higher shear loading resistance than the adhesive without MDP in both thermocycling and nonthermocycled samples. The results of this study are consistent with previous studies that have found MDP to be an effective functional monomer in forming a chemical bond with dentin. However, other studies have

suggested that other functional monomers, such as GPDM, may be equally or even more effective than MDP in certain situations.

It is essential to keep in mind that the choice of adhesive type and application technique will depend on the specific clinical case, as different adhesives may have distinct advantages and disadvantages depending on the conditions of the dentin and the treatment it is subjected to. Generally, universal adhesives with functional monomers, such as MDP, are an effective option to achieve strong adhesion to dentin and improve the durability of dental restorations.

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Informed Consent Statement
Not applicable.

Conflicts of Interest
The authors declare no conflict of interest.

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Prevalence and types of congenital heart disease in patients with Down syndrome in a hospital in Ecuador

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Abstract

Down syndrome, also known as trisomy 21, is a common chromosomal condition associated with congenital heart disease in 40-60% of cases, leading to serious medical complications. In a descriptive, retrospective, cross-sectional study conducted at the Hospital General Puyo in Ecuador over four years, 30 patients with Down syndrome were examined to determine the frequency of each type of congenital heart disease in this population. The results showed that non-cyanotic heart defects were the most common, with atrial and ventricular septal defects being the most prevalent, followed by the atrioventricular canal. The prevalence of congenital heart disease was higher in men and patients from Pastaza. Most cases were found in preschoolers, with a higher frequency in patients older than two years. This study provides essential information on the prevalence and types of congenital heart disease in patients with Down syndrome, which may help to improve early diagnosis and treatment of these conditions in this population.

Keywords: Down Syndrome, Cardiac Malformations, Atrial Septal Defect, Ventricular Septal Defect.

Prevalencia y tipos de cardiopatías congénitas en pacientes con Síndrome de Down en un hospital de Ecuador

Resumen

El Síndrome de Down, también conocido como trisomía 21, es una afección cromosómica común que se asocia con cardiopatías congénitas en un 40 a 60% de los casos, lo que puede llevar a complicaciones médicas graves. En un estudio descriptivo, retrospectivo y de corte transversal realizado en el Hospital General Puyo, en Ecuador, durante un período de cuatro años, se examinaron 30 pacientes con Síndrome de Down para determinar la frecuencia de cada tipo de cardiopatía congénita en esta población. Los resultados mostraron que las cardiopatías no cianóticas eran las más comunes, siendo las comunicaciones interauriculares y las comunicaciones interventriculares las más prevalentes, seguidas del canal auriculoventricular. La prevalencia de las cardiopatías congénitas fue mayor en hombres y en pacientes de la provincia de Pastaza. La mayoría de los casos se encontraron en preescolares, con una mayor frecuencia en pacientes mayores de dos años. Este estudio proporciona información importante sobre la prevalencia y los tipos de cardiopatías congénitas en pacientes con Síndrome de Down, lo que puede ayudar a mejorar el diagnóstico y tratamiento tempranos de estas afecciones en esta población.

Palabras clave: Síndrome de Down, Malformaciones Cardíacas, Comunicación Interauricular, Comunicación Interventricular.

Prevalência e tipos de doenças cardíacas congênitas em pacientes com Síndrome de Down em um hospital no Equador

Resumo

A síndrome de Down, também conhecida como trissomia do cromossomo 21, é uma condição cromossômica comum que está associada a doenças cardíacas congênitas em 40-60% dos casos, o que pode levar a sérias complicações médicas. Em um estudo descritivo, retrospectivo e transversal realizado no Hospital General Puyo no Equador durante um período de quatro anos, 30 pacientes com síndrome de Down foram examinados para determinar a freqüência de cada tipo de cardiopatia congênita nesta população. Os resultados mostraram que as cardiopatias não cianóticas eram as mais comuns, sendo os defeitos do septo atrial e os defeitos do septo ventricular os mais prevalentes, seguidos pelo canal atrioventricular. A prevalência de cardiopatias congênitas foi maior em homens e em pacientes da província de Pastaza. A maioria dos casos foi encontrada em pré-escolares, com uma freqüência maior em pacientes com mais de dois anos. Este estudo fornece informações importantes sobre a prevalência e os tipos de cardiopatias congênitas em pacientes com síndrome de Down, o que pode ajudar a melhorar o diagnóstico precoce e o tratamento destas condições nesta população.

Palavras-chave: Síndrome de Down, Malformações Cardíacas, Defeito Septal Atrial, Defeito Septal Ventricular.

1. Introduction

Down syndrome or trisomy 21, one of the best-known chromosomal alterations and the most prevalent worldwide, has an estimated incidence of 1 in 600 to 1 in 1000 live newborns [1]. It contains features that make it a characteristic syndrome; it has been established that it has a 40 to 60% relationship with congenital heart disease. Moreover, it has been found that congenital heart disease along with respiratory infections is among the two leading causes of mortality in patients with Down syndrome in the corresponding age range of 0 to 2 years [2].

Different studies have observed that children with Down syndrome present congenital heart disease, with atrioventricular wall defects being more frequent. The early approach to these defects has given better results when they are surgically resolved. For this reason, it is essential to diagnose and treat congenital malformations promptly [2].

Congenital heart disease associated with Down syndrome is related to the genetic alteration that carries this pathology. It is an alteration that often requires surgical correction to improve prognosis and increase life expectancy in this patient. Hence the importance of early diagnosis [3]. The preferred method for diagnosing new cases of heart disease in Down syndrome is echocardiography to determine its hemodynamic impact on the patient [4].

It has been established that 8 to 10 of every 1000 live newborns have some congenital heart disease. Therefore, it has been selected as one of the most frequent defects in Down syndrome [5]. Based on the data described above, it is evident that this type of defect requires an exhaustive study to obtain real data in our environment, which will allow us to know the reality of this type of malformation. According to the study developed by the 'Manuela Espejo Mission', it has been detailed that, in Ecuador, around 7,457 people have Down Syndrome or Trisomy 215. Of these, 3597 (48.24%) are women, and 3860 (51.76%) are men [6].

Down syndrome is a frequent chromosomal alteration; this chromosomal alteration, together with cleft lip, is considered one of the leading causes of morbidity in Latin America. It can be seen that congenital heart disease in Down syndrome has a high frequency; in several studies carried out in Mexico and Colombia, a frequency of 40 to 60% has been obtained. In fact, in similar studies in different parts of Colombia, a slight tendency towards the male sex can be seen, and it is the fourth most frequent type of chromosomal alteration [7].

In Ecuador, after several studies, it has been shown that Down syndrome is present in 1 per 550 live births. This represents a prevalence rate in our country of 0.06 per 100 inhabitants. It has been established that the provinces of Manabi, Sucumbios, and Santo Domingo have the highest prevalence, with 0.09 per 100 inhabitants. In contrast, in the provinces of Carchi, Chimborazo, Imbabura, and Pichincha, it is 0.03%. No studies have been conducted in Pastaza [4]. The absence of primary data on the frequency of heart disease associated with Down syndrome in this region of the country is the reason for conducting this important study that can serve as a starting point for further research on the subject. Therefore, this study seeks to be a reference point, providing primary data for further analysis.

The methodology is presented in section 2, and the results in section 3. The discussion is shown in section 4.

2. Methodology

2.1. Type and design of research

This is a descriptive, cross-sectional, retrospective study that seeks to determine the frequent congenital heart diseases in patients with a previous diagnosis of Down Syndrome at the General Hospital Puyo, Pastaza Province, from January 2014 to May 2018.

2.2. Population under study

All patients diagnosed with congenital heart disease with Down syndrome at the Hospital General Puyo will be analyzed. This project was carried out at the Hospital General Puyo of the Ministry of Health, which has the Internal Medicine Service and, within this, the Cardiology specialty. The period to be analyzed is from January 1, 2014, to May 31, 2018.

2.3. Inclusion criteria

The entire population with a diagnosis of congenital heart disease with Down syndrome was taken.

2.4. Population size

The cardiology specialist reported the number of cases diagnosed with congenital heart disease in patients with Down syndrome at the Hospital General Puyo, Pastaza Province, from January 2014 to May 2018. No sample calculation was required because it was a small universe.

2.5. Data collection and synthesis technique

For the collection, the database provided by the Hospital Statistics Center was reviewed from January 01, 2014, to May 31, 2018. In the case of identifying the record of a patient with a diagnosis of Congenital Heart Disease and Down Syndrome, it was corroborated by reviewing medical records or by the echocardiographic diagnosis expressed in the medical history.

2.6. Hypotheses

The most frequently diagnosed congenital heart diseases in patients with Down syndrome at Hospital General Puyo are due to defects of the atrioventricular wall.

3. Results

3.1. Distribution of patients by age at diagnosis of heart disease

Congenital heart disease was more frequently diagnosed in preschoolers, with 9 cases (30%), the same number as in younger infants (Figure 1). In addition, if we add the cases reported at the school stage, 5 cases (16.66%) to the preschoolers, we have 14 cases (46.6%); that is, almost half of the cases diagnosed with congenital heart disease were described at an advanced age.

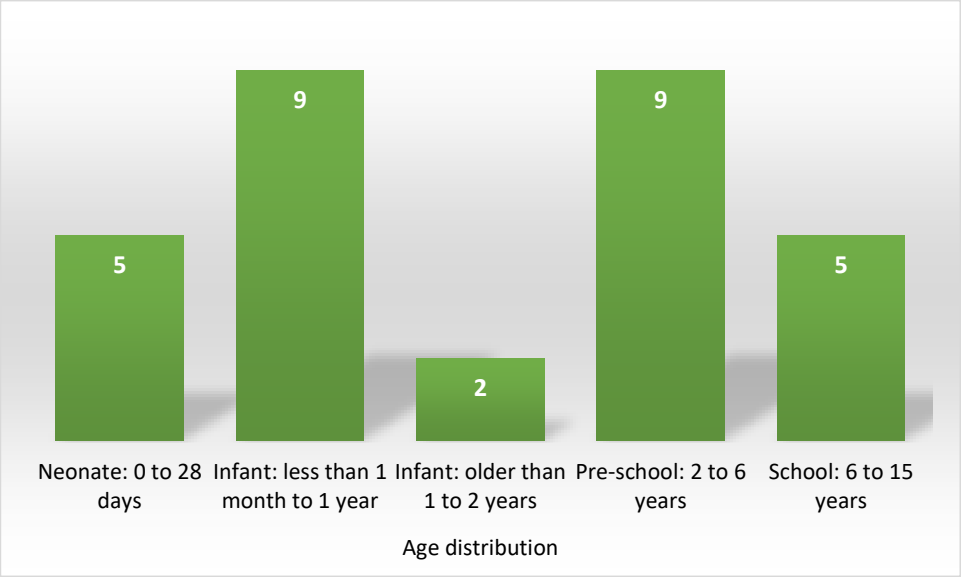

Figure 1. Distribution of patients by age at diagnosis.

3.2. Distribution of patients by sex

There is a slight inclination towards the male sex, 53.3%, compared to 46.7% in the female sex (Figure 2), so no differences could be established in this study.

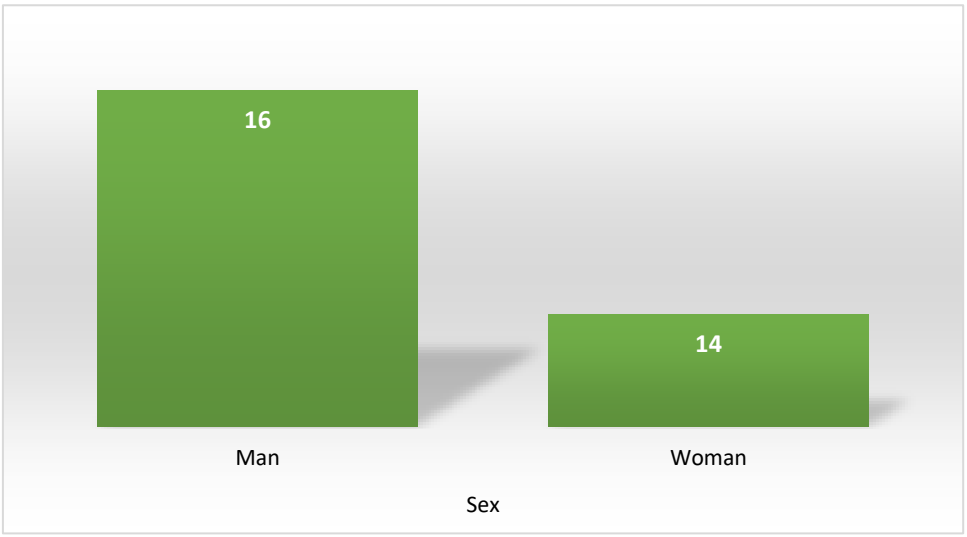

Figure 2. Distribution of patients by sex.

3.3. Distribution of patient by origin

Pastaza is the province with the highest number of cases of congenital heart disease in patients with Down syndrome, with 15 patients, i.e., 50% of the cases, due to being the location of the research center, as shown in Figure 3. In addition, Hospital General Puyo has Neonatology, Pediatrics, Genetics, and Cardiology services. In addition, it can be seen that Tungurahua is the province with the second highest number of cases, with nine patients (30%), due to its proximity to the study site. While the provinces farther away from the research site had the lowest number of cases, that is, Napo and Morona Santiago, in addition to these provinces having second-level hospitals.

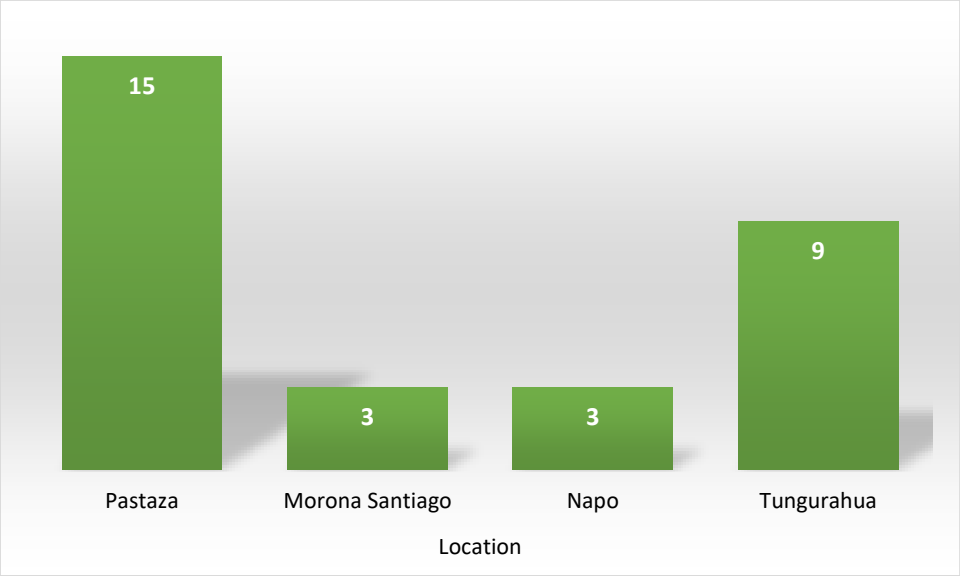

Figure 3. Distribution of patients by origin.

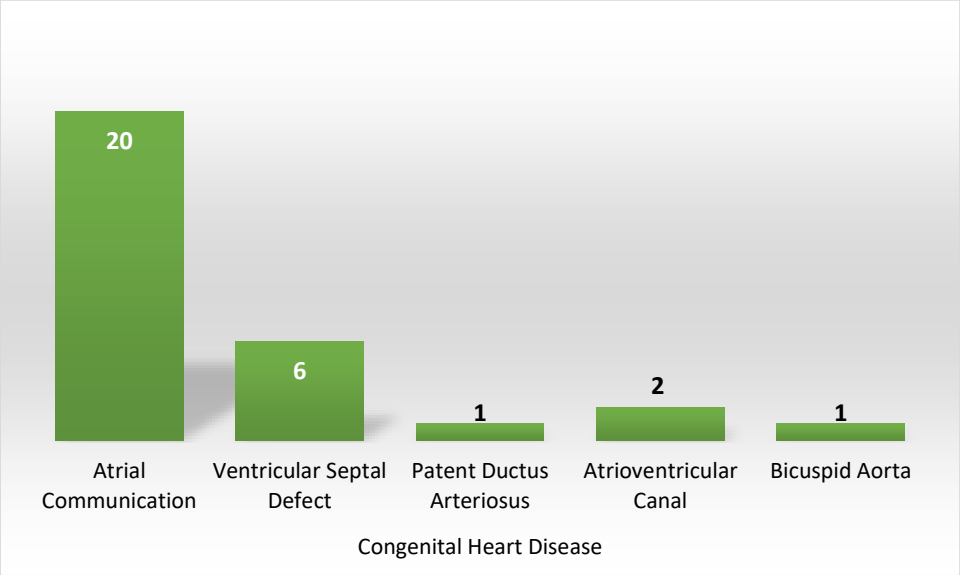

Figure 4. Distribution of patients by the variable congenital heart disease.

3.4. Distribution of patients by type of congenital heart disease

In this study, all the cases were non-cyanotic congenital heart disease. The most frequent congenital heart disease was an atrial septal defect (66.7%), followed by a ventricular septal defect (20%). This is followed by a ventricular septal defect (20%), as shown in Figure 4. Three cases of the atrioventricular canal were observed, two of which were accompanied by a ventricular septal defect and one by an atrial septal defect. In addition, there was one case of persistent ductus arteriosus and one of the bicuspid aorta.

4. Discussion

Our study had several limitations, among which the most important was the need for more specific data since the Genetics service at the Hospital General Puyo was recently incorporated. The main limitation was the data collected from all patients with Down syndrome who have attended the Hospital, which is why it was impossible to calculate the frequency of cardiopathies in children with Down syndrome. Still, obtaining the children with Down syndrome and cardiopathy from the cardiology service was possible, thus establishing the most frequent. The atrial septal defect was found first, with a relative frequency of 66.7%. A correlation can be seen with studies where it is present in 51.8%, as [5]. The non-presence of cyanotic congenital heart disease may be due to the small sample size presented in this study.

Other studies found that the most frequent non-cyanotic congenital heart disease associated with Down syndrome is a ventricular septal defect (61%), as reported [8]. Similar studies show ventricular septal defect as the most frequent cardiopathy, such as the study by [7], where 61.74% is obtained. The present study showed ventricular septal defect as the second most frequent congenital heart disease associated with Down syndrome, with a relative frequency of 20%. This was followed by 3 cases of the atrioventricular canal, one of patent ductus arteriosus and one of the bicuspid aorta. All the pathologies found in this study belong to non-cyanotic congenital heart disease. According to the bibliography consulted, we can demonstrate that in the Hospital General Puyo, we have not found concordance of the most frequent congenital cardiopathies with the rest of the studies since the atrioventricular canal is described as the most frequent, representing up to 80% of the cardiopathies, as it is mentioned [2].

Twenty-five cases were found with single heart disease; in 5, more than two heart diseases were found in the same patient. Regarding sociodemographic factors, the male sex was slightly predominant with an absolute frequency of 16 cases (53.3% relative frequency), compared to 14 cases in the female sex, corresponding to a relative frequency of 46.7%, so there was no evidence of a predominance of one sex over the other. These data do not agree with several studies where 52.5% were observed for the female sex. Therefore, it has not been possible to establish differences between one sex over the other [9].

The ages at which these heart diseases were diagnosed were divided into age groups in which preschoolers and young infants were among the most frequent, with 9 cases corresponding to 30% of relative frequency for each. There is evidence of a problem in the echocardiographic screening of the different congenital heart diseases associated with Down syndrome; if we add the cases found in the preschool and school stages, obtaining about 14 cases, corresponding to a relative frequency of 46.6%, This means that almost half of the diagnosed cases of congenital heart disease were described at an advanced age, showing a late diagnosis of this type of heart disease since it is recommended that children with Down syndrome be followed up by cardiology before the age of one month and timely surgical correction before six months of life [10].

Concerning the place of origin of the patients, there have been no previous studies on this variable in our environment; however, with the present study, we found that in the province of Pastaza, there is a more significant number of cases of congenital heart disease in patients with Down syndrome with a relative frequency of 50%, due to the better structural organization of the General Hospital Puyo, which has a direct interrelation between the Neonatology, Pediatrics, Genetics, and Cardiology services. As for the other

provinces of residence, it can be seen that the province of Tungurahua is the second with the second highest number of cases; we could explain this data due to the geographical proximity that exists between these two provinces and the fact that the hospital becomes a point of reference in terms of echocardiographic screening of this type of malformations in pediatric patients. An attempt was made to perform bivariate analysis considering the variable heart disease versus sex, age, place of origin, and type of heart disease. However, statistical significance was not found in the results, probably due to the study's small sample size. The present study can guide further research to estimate the incidence and prevalence of patients with congenital heart disease and Down syndrome in this country's region [11], [12].

5. Conclusions

Congenital heart disease associated with Down syndrome is highly frequent in our environment, among which the most frequent type is non-cyanotic. No cases of cyanotic congenital heart disease were recorded due to the small sample of our study. Among the sociodemographic variables of the patients with congenital heart disease diagnosed with Down syndrome, the majority were male, without denoting a marked difference; more studies have been found that support the higher frequency in the female sex. The most frequent age range in which the diagnosis was made was in preschoolers, the diagnosis and surgical correction of these pathologies are recommended before six months of age, so we think these patients should have been approached earlier. Of all the patients diagnosed, 50% were from Pastaza, while the rest came from other provinces; this variable has not been studied in other studies.

The most frequent congenital heart disease in patients diagnosed with Down syndrome is an atrial septal defect, followed by a ventricular septal defect; this is associated with the bibliography consulted in Latin American studies but is not related to the American studies name atrioventricular canal as the most frequent defect. Three cases of the atrioventricular canal have been found, all of which are non-cyanotic congenital heart defects. Only 5 cases presented two concomitant heart diseases, while the majority (25 cases) showed a single heart disease. Our study had several limitations, including the lack of specific data collection. The main limitation was the data collected from all the patients with Down syndrome who have attended the Hospital, which is why it was impossible to calculate the frequency of heart disease in children with Down syndrome. Still, obtaining the children with Down syndrome and heart disease from the cardiology service was possible, thus establishing the frequency of each heart disease and determining the most frequent ones.

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Institutional Review Board Statement

Not applicable.

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Conflicts of Interest

The authors declare no conflict of interest.

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Intestinal Pneumatosis in the Elderly: Case Report

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Abstract

Intestinal pneumatosis presents itself as a digestive pathology of very low regularity. It affects essential organs of the digestive system, so its timely treatment is necessary to avoid complications in the patient. In this article, we present the case of an 81-year-old man admitted for a probable case of obstructive abdomen. The study by radiography and ultrasound of the abdomen revealed intestinal pneumatosis. Therefore, medical management was performed according to the protocol presented in this paper. During his stay at the Hospital General Provincial de Latacunga in Ecuador, he gave a favorable evolution with a notable improvement in his health. This proves that good health practices can correct this type of rare pathologies.

Keywords: Intestinal Pneumatosis, Older Adult, Case Report, Surgery.

Neumatosis Intestinal en el Adulto Mayor: Reporte de un Caso

Resumen

La neumatosis intestinal se presenta como una patología digestiva de muy baja regularidad. Afecta a órganos esenciales del aparato digestivo, por lo que es necesario su tratamiento a tiempo para evitar complicaciones en el paciente. En este artículo presentamos el caso de un varón de 81 años ingresado por un probable cuadro de abdomen obstructivo. El estudio radiográfico y ecográfico del abdomen reveló neumatosis intestinal. Por lo tanto, el manejo médico se realizó según el protocolo presentado en este trabajo. Durante su estancia en el Hospital General Provincial de Latacunga en Ecuador, presentó una evolución favorable con una notable mejoría de su salud. Esto demuestra que las buenas prácticas sanitarias pueden corregir este tipo de patologías poco frecuentes.

Palabras clave: Neumatosis Intestinal, Adulto Mayor, Caso Clínico, Cirugía.

Pneumatose Intestinal em Idoso: Relato de Caso

Resumo

A pneumatose intestinal se apresenta como uma patologia digestiva de muito baixa regularidade. Ela afeta órgãos essenciais do sistema digestivo, portanto, seu tratamento oportuno é necessário para evitar complicações no paciente. Neste artigo, apresentamos o caso de um homem de 81 anos admitido para um provável caso de abdômen obstrutivo. O estudo por radiografia e ultra-sonografia do abdômen revelou

pneumatose intestinal. Portanto, a administração médica foi realizada de acordo com o protocolo apresentado neste artigo. Durante sua estada no Hospital Geral Provincial de Latacunga, no Equador, ele deu uma evolução favorável com uma notável melhora em sua saúde. Isto prova que as boas práticas de saúde podem corrigir este tipo de patologias raras.

Palavras-chave: Pneumatose intestinal, adulto mais velho, Relato de caso, Cirurgia.

1. Introducción

La neumatosis intestinal es una entidad clínico-patológica poco frecuente definida como la presencia de gas en la pared intestinal. Sus primeras descripciones fueron realizadas por Du Veroin en el siglo XVIII. También se conoce como linfoneumatosis intestinal, linfoneumatosis peritoneal, neumatosis cistoides, enfisema intestinal y enfisema buloso del intestino. La neumatosis intestinal es un signo y no un diagnóstico, la cual puede comprometer cualquier zona del intestino, ser localizada o extensa e instalarse tanto en la submucosa como en la subserosa parietal [1].

Una vez evidenciado este signo, es necesario evaluar la necesidad de una eventual resolución quirúrgica, en el caso de padecer de isquemia mesentérica. Sin embargo, en la mayoría de los casos es benigno y de resolución espontánea, habiendo sido descritas variadas etiologías que pudieran explicar este signo, tales como cierta patología respiratoria crónica, procedimientos quirúrgicos-endoscópicos, enfermedades sistémicas y drogas.

A pesar de no ser una enfermedad reciente su etiología no está clara. Existe una teoría mecánica que propone que el aire comprimido en la luz intestinal penetra en la pared a través de defectos en la mucosa. Algo parecido ocurre en la teoría “respiratoria” en la que el aire diseca el retroperitoneo y entra al mesenterio posterior a la ruptura de alvéolos en pacientes con enfermedad pulmonar obstructiva crónica. La teoría bacteriana que es la más aceptada, propone que bacilos formadores de gas entran en la submucosa a través de defectos en ella; sin embargo, no se han logrado cultivar microorganismos de los quistes. El uso de esteroides y medicamentos inmunosupresores juega un papel importante. Se ha propuesto que la inmunosupresión crea defectos en la mucosa permitiendo la disección del aire en la pared intestinal [2].

Se puede clasificar a la neumatosis intestinal en primaria y secundaria. Ésta última representa 85% de los casos. Clásicamente se ha descrito en prematuros con colitis necrosante, cardiopatías congénitas, y en adultos con enfermedad pulmonar crónica, en niños y adultos con gran variedad de patologías gastrointestinales, tratamiento con esteroides y otros medicamentos inmunosupresores. La incidencia hombre: mujer es semejante y se presenta con mayor frecuencia entre la cuarta y séptima décadas de la vida, su incidencia es de aproximadamente 0.03% [1], [3], [4].

Este artículo consta de tres secciones, incluyendo la introducción en la sección 1. El caso clínico se presenta en la sección 2 y la discusión en la sección 3.

2. Caso clínico

Hombre de 81 años de edad, con antecedentes de diabetes mellitus tipo 2, EPOC, hipertensión arterial estadio 1 y micosis bucal, importancia consulta por presentar un cuadro de 24 horas de evolución caracterizado por distensión abdominal, náuseas, vomito de contenido alimentario, más dolor abdominal tipo retortijón, por lo que acude al servicio de emergencia del Hospital General de Latacunga.

Signos vitales al ingreso: FC: 80 lpm, FR: 20 rpm, TA: 117/48 mmHg, T: 37o C, Talla: 170 cm, Peso: 52 kg, IMC: 17.99 kg/m2, Paciente consciente, orientado en tiempo espacio y persona, afebril, hidratado, abdomen suave

distendido, doloroso a la palpación profunda de forma difusa, ruidos hidroaéreos disminuidos, se percute timpanismo en toda la región abdominal.

2.1. Estudios Diagnósticos

Biometría hemática: Leucocitos: 6k/uL, Eosinófilos: 0.8%, Neutrófilos: 59.5%, Linfocitos: 33.3%, Monocitos; 6.4%, Hematocrito: 44.7%, Hemoglobina: 14.06 g/dl, Glóbulos rojos: 4.66k/uL, MCH: 33 pg, MCHC: 34.4 g/dL, MCV: 96 fL, Plaquetas: 250k/uL, TTP: 28.50 seg, TP: 11.90 seg. Química sanguínea: Glucosa: 133 mg/dL, Na: 138 mmol/l, K: 4.30 mmol/l. Cl: 100 mmol/l, Creatinina: 1,18 mg/dl.

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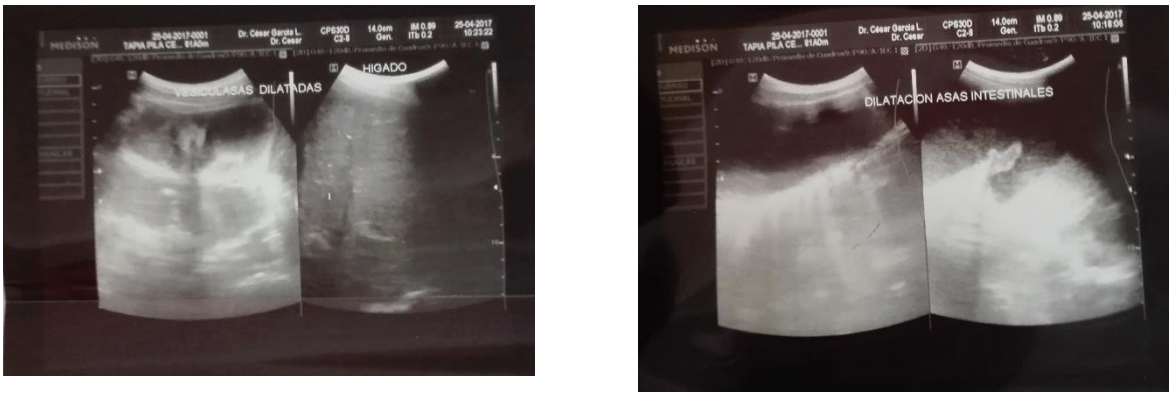
2.2. Eco abdominal

Como se puede apreciar en la Figura 1, no existen procesos ocupativos, tampoco dilatación de las vías biliares intra-extra hepáticas. La vesícula biliar tiene paredes delgadas anecogénicas de 10x1.8x4.9cm, en el interior de la luz no existe contenido litiásico. Al momento se observa importante dilatación de asas intestinales en relación a un abdomen agudo obstructivo, no se observa signos de líquido libre en cavidad abdominal.



(a) (b)

Figura 1. Ecosonografía abdominal: (a) Vesícula e hígado. (b) Dilatación asas intestinales.

2.3. Radiografía de tórax y abdomen

Se evidencia dilatación de las asas intestino delgado, con presencia de algunos niveles hidroaéreos y la presencia de gas distal. Se evidencia paredes intestinales engrosadas compatibles con neumatosis intestinal. Esto se aprecia de mejor manera en la Figura 2.

2.4. Manejo quirúrgico

Diagnóstico preoperatorio: Abdomen obstructivo agudo.

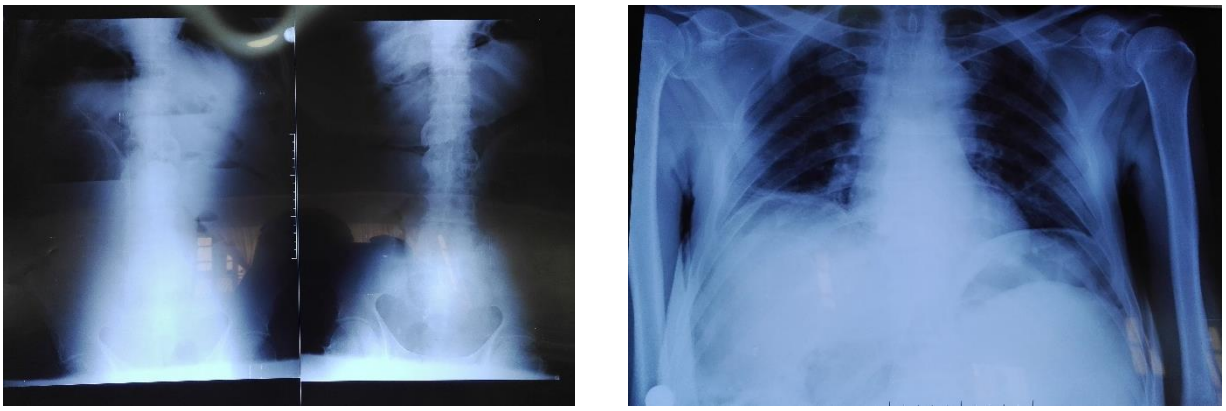
Diagnóstico postoperatorio: abdomen obstructivo por estenosis producida por neumatosis de intestino delgado.

2.5. Hallazgos

Intestino delgado distendido con múltiples quistes de diferente tamaño en todas las caras del intestino desde tres metros del ángulo de Treitz hasta 1 metro de la válvula ileocecal. En los tres metros de intestino delgado afectado se observa a 1 metro de la válvula ileocecal estenosis del intestino delgado.

Cirugía realizada: Resección de 80cm del segmento de estenosis + ileostomía

Resultados histopatológicos: No se realiza.



(a) (b)

Figura 2. Radiografía: (a) Abdomen simple de proyección vertical. (b) Tórax.

2.6. Manejo clínico

Después de la cirugía se administra: ampicilina + sulbactam 1. 5 gr IV cada 6 horas, metronidazol 500 mg cada 8 horas, tramadol 50 mg cada 8 horas, paracetamol 1 gr cada 8 horas, ondasetrón 4mh cada 8 horas, ranitidina 50 mg cada 12 horas.

Se realizó interconsulta de medicina interna que prescriben: Metformina + glibenclamida 500/2.5mg VO cada 12 horas, ASA 100mg VO cada día, enalapril 5mg VO cada día.

3. Discusión

Este caso se llevó a cabo en el Hospital General Provincial de Latacunga, un hospital de segundo nivel que atiende a una población de ingresos medios y de bajos recursos, siendo necesario tener en cuenta estos aspectos para el análisis del mismo.

La neumatosis intestinal es una patología poco frecuente, incluido nuestro medio, teniendo como incidencia global 0.3% casos al año, se estima que el tipo primario o idiopático corresponde al 15% de los casos, y el tipo secundario corresponde al 85% de los casos reportados. La etiología de esta patología es aún desconocida siendo las principales mecánicas que se manejan la pulmonar, bacterianas y bioquímicas.

La teoría pulmonar se basa en el aumento de la presión intraluminar, la fuga de aire a través del mediastino y del retroperitoneo para acumularse en el dentro del mesenterio del intestino y la teoría bacteriana es la formación de gas a partir de microorganismos tales como Clostridia y E. coli, que migra a la pared intestinal, la teoría bioquímica es el aumento de gas hidrógeno en el metabolismo de los carbohidratos aumenta la presión intraluminal [1], [2].

En nuestro caso el antecedente de EPOC del cual padecía nuestro paciente pudo haber ocasionado una rotura alveolar con la posterior fuga de gas a la pared intestinal quedando atrapado en esta zona. El Gold estándar para diagnóstico de la neumatosis intestinal es la tomografía computarizada, para evitar realizar cirugías innecesarias, en nuestro paciente se realizó una Ecosonografía y radiografía de abdomen el cual indicaba una distención de las asas del intestino, sin la presencia de líquido libre en la cavidad abdominal, y un aumento del

grosos de la pared del intestino, mostrando radiológicos que ayudaron a llegar a su diagnóstico, a pesar que la radiografía tiene una sensibilidad del 23% [1], [3].

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Declaración de la Junta de Revisión Institucional
No aplica.

Declaración de consentimiento informado
Se obtuvo el consentimiento informado del participante en el estudio.

Conflicto de Intereses
El autor declara no tener ningún conflicto de intereses.

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Prevalence of Lumbar and Cervical Pain in Industrial and Construction Workers: A Case Study in Ecuador

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Abstract

The health of workers in the industrial and construction sectors can be affected by ergonomic and physical risks. This cross-sectional study conducted in Ecuador in 2021 aims to establish the prevalence of lumbar pain associated with working conditions in workers in these sectors. A total of 207 workers from the construction and industrial sectors were selected, and a control group of administrative workers was used. Two questionnaires were applied, one on work and health conditions in Latin America and another Nordic questionnaire adapted to each sector. Results show a high prevalence of lumbar pain (40.58%) associated with the male sex, more paid jobs, working in construction-related sectors, and handling loads. Additionally, a high prevalence of neck pain (35.74%) was found, especially in administrative personnel. Results suggest the need for preventive measures to reduce lumbar and cervical pain, such as improving ergonomic conditions and implementing injury prevention training programs.

Keywords: Construction, Lumbar Pain, Ecuador, Occupational Health.

Prevalencia de Dolor Lumbar y Cervical en Trabajadores Industriales y de Construcción: Un Caso de Estudio en Ecuador

Resumen

La salud de los trabajadores en los sectores industrial y de la construcción puede verse afectada por una serie de riesgos, principalmente de tipo ergonómicos y físicos. El objetivo de este estudio descriptivo de corte transversal realizado en Ecuador en 2021, es establecer la prevalencia de dolor lumbar asociado a las condiciones de trabajo en los trabajadores de estos sectores. Para llevar a cabo este estudio se seleccionó a un total de 207 trabajadores de los sectores de la construcción e industrial, y se utilizó un grupo de control compuesto por trabajadores administrativos. Se aplicaron dos cuestionarios, uno de condiciones de trabajo y salud en Latinoamérica y otro cuestionario nórdico adaptado a cada uno de los sectores. Los resultados del estudio indican una alta prevalencia de dolor lumbar (40.58%) en los trabajadores, y se encontró que esta prevalencia está asociada con el sexo masculino, un mayor número de trabajos remunerados, pertenecer a sectores asociados a la construcción y manipular cargas. Además, se determinó una alta prevalencia de dolor de cuello (35.74%) especialmente en el personal administrativo. Los resultados sugieren la necesidad de adoptar medidas preventivas para reducir la prevalencia de dolor lumbar y cervical en el lugar de trabajo,

como la mejora de las condiciones ergonómicas y la implementación de programas de capacitación en prevención de lesiones laborales.

Palabras clave: Construcción, Dolor Lumbar, Ecuador, Salud Ocupacional.

Prevalência de dores lombares e cervicais em trabalhadores industriais e da construção civil: um estudo de caso no Equador

Resumo

A saúde dos trabalhadores dos setores industrial e da construção civil pode ser afetada por uma série de riscos, principalmente ergonômicos e físicos. O objetivo deste estudo transversal descritivo realizado no Equador em 2021 é estabelecer a prevalência de dores lombares associadas às condições de trabalho nos trabalhadores desses setores. Um total de 207 trabalhadores dos setores de construção e industrial foram selecionados para realizar este estudo, e um grupo de controle de trabalhadores administrativos foi utilizado. Foram administrados dois questionários, um sobre condições de trabalho e saúde na América Latina e outro questionário nórdico adaptado a cada um dos setores. Os resultados do estudo indicam uma alta prevalência de dores lombares baixas (40,58%) nos trabalhadores, e verificou-se que esta prevalência está associada ao sexo masculino, um maior número de empregos remunerados, pertencentes a setores associados à construção e à movimentação de cargas. Além disso, foi encontrada uma alta prevalência de dores no pescoço (35,74%), especialmente no pessoal administrativo. Os resultados sugerem a necessidade de medidas preventivas para reduzir a prevalência de dores lombares e cervicais baixas no local de trabalho, tais como a melhoria das condições ergonômicas e a implementação de programas de treinamento na prevenção de lesões ocupacionais.

Palavras-chave: Construção, Dor nas Costas, Equador, Saúde Ocupacional.

1. Introduction

According to the World Health Organization (WHO) [1] musculoskeletal diseases have a high prevalence worldwide; about 1710 million people worldwide have suffered an event related to musculoskeletal disorders. Musculoskeletal symptoms are considered one of the most relevant factors at the time of need for rehabilitation worldwide because they represent 17% of disabilities worldwide. In addition, musculoskeletal symptoms not only provide a deterioration at the level of the muscular and skeletal systems but also produce a deterioration in functional capacity and mental health. Low back pain is one of the most common musculoskeletal diseases globally, with an approximate prevalence of 70%. According to various studies, 70 to 85% of people worldwide have suffered some condition or event related to low back pain. Of these, 80% improve during the first week without complications and only 10% progress to chronicity [2]. Additionally, chronic low back pain, defined as lower back pain for more than three months, is the first to reduce the collaborator's quality of life.

An observational, descriptive study, carried out in 12,024 workers from Central America, aimed to establish the prevalence of musculoskeletal symptoms. It obtained as a result a prevalence of 87%, where the cervicodorsal (34%), upper limbs (31%) and lumbar region (22%) were established as frequent body locations. In a cross-sectional trial that was carried out in the city of Barranquilla, Colombia, it was possible to show that 82% of musculoskeletal symptoms were located in the lower back [3]. Low back pain not only affects the quality of life of the collaborator, but also significantly decreases the productivity of the company. In North American countries, low back pain has established itself as the second cause of work impediment worldwide,

where one in five cases of low back pain progresses to chronicity. This establishes higher spending on health and decreased labor productivity and decreased daily activities.

Low back pain is associated with many factors, categorizing it as a multifactorial disease. Among these factors are the innate characteristics of the collaborator, physical resistance, joint ability, age, sex, height, and overweight, among others. Occupational factors include excessive work, static postures, inappropriate twisting and flexing of the trunk, excessive lifting and movement, repetitive work, and vibrations [4]. In the study by [5], a high prevalence of low back pain could be observed in the collaborators, with migrant workers being the ones with the highest prevalence of low back pain (80%) compared to the locals (42%). This is due to the effort-reward imbalance, 82% for migrants and only 19% for locals. In [6] the working conditions of 349 people who attended the trauma area in Valencia, Spain, was analyzed. The main result was a positive correlation between the manual lifting of loads and the days of disability, without counting the age and gender of the participants. In addition, it was possible to observe that the collaborators who carry out load lifting had an excessive work overload and a low economic situation.

According to [7], there is a positive correlation between manual load handling and disability, with a 66% prevalence of absenteeism due to low back pain. In addition, he observed that only 39% of the workers participating in this study had received training on this topic. Likewise, there are studies in which a statistical significance could not be determined between low back pain and the type of work, such as the study by [8]. In this research with 745 people, there was a high prevalence of low back pain (60%) in workers, regardless of the load.

1.1. Low back pain in the Ecuadorian construction sector

A high percentage of low back pain has been evidenced in workers in the construction sector; In a study in which 19,441 workers participated, the prevalence of low back pain could be determined at 26.4%; From this result, it was evidenced that the highest percentage belonged to the construction sector and cleaning workers, according to [9]. In a study by [10], 140 workers from a land company participated, and a high prevalence of low back pain was evidenced, establishing a percentage of 55%; it was possible to determine a high prevalence of shoulder pain with 31.4 %. In addition, it was possible to establish a statistical relationship, where it was determined that people with a BMI greater than 25 percent are more likely to have a picture of low back pain; in addition, a statistical relationship was established between years of work and low back pain. In another descriptive cross-sectional study carried out on 100 workers in Spain who presented low back pain sedentary lifestyle with a prevalence of 47%, overweight or obese with 56%, and lifting loads with 42%; It was also established that the workers who presented lower job satisfaction are the ones who presented the most significant number of days of absence due to low back pain, according to [11].

Another cross-sectional investigation, carried out in the city of Peru, with the participation of 900 workers, determined employee and work conditions related to the presentation of low back pain in 9 work areas exposed to risk factors (Sharon Inga, Karen Rubina, 2021). Where it was obtained as data, a 98% prevalence of low back pain, which was primarily found to be associated with the male sex ($p<0.04$), the construction sector ($p<0.01$), at an advanced age ($p<0.01$) and a more significant number of work hours performed (0.01), in addition, a statistically significant association could be observed between low back pain and work incapacity.

The percentage of low back pain in Ecuador has not shown a range different from that established in studies worldwide. In a cross-sectional study carried out in an Ecuadorian oil company with the participation of 102 male workers aged between 30-40 years, a prevalence of musculoskeletal diseases of 74.2% was established using the global standardized Nordic questionnaire [13[12]. Where a prevalence of 64.7% of low back pain, 43.1% of back pain, 37.3% of cervical pain, and 26.5% of shoulder pain was evidenced, data very similar to those obtained at the level in another descriptive trial, which was carried out in the city of Cuenca, 56 workers

from a meat food sale and distribution company participated, obtaining a high prevalence of musculoskeletal symptoms at the level of the thoracolumbar spine (76.78%). , followed by neck pain (48.2%) and wrist or hand pain (30.35%); it was also established that operating personnel have a higher risk of suffering musculoskeletal problems compared to administrative personnel, who presented a protective factor, according to [13].

In another cross-section, whose objective was to see the prevalence of low back pain in cleaning workers associated with forced postures at work, it was possible to determine a prevalence of 77% where a statistical association with the forced posture was evidenced. However, this study presented a population that was not so significant, but the values obtained coincide with global trends, and this is according to [14].

This article consists of four sections, including the introduction in section 1. The methodology is presented in section 2, and the results in section 3. The discussion is shown in section 4.

2. Methodology

2.1. Participants

Workers in sectors associated with construction and industrial sector in Ambato and Quito, Ecuador. Five companies participated, including a hardware company, a heavy material construction company, a poultry farm, a paint manufacturing and distribution company, and a finishing material manufacturing and distribution company, which were selected for their work history.

For this investigation, all the workers were selected, with the participation of 211 workers. Of these, four workers were excluded for not complying with the appropriate work time in the company; this is greater than 12 months. Establishing a total population of 207 workers, which were divided into two groups for comparison and study, in the first group was the administrative staff, managers, assistant managers, clerks, accountants, secretaries, and treasurers, among others—the second comprised operational personnel, where they found warehouse workers, storekeepers, stevedores, and cashiers. The administrative staff of the sectors above would be formed as a comparison group.

2.2. Inclusion and exclusion criteria

Due to their education status, 15 workers needed help to answer their online questionnaire, which, once completed, was transcribed into the digital form for subsequent data collection. In one of the questionnaire questions on conditions and health at work in Latin America, five erroneous data were obtained due to poor structuring of the question, resolved at the time of tabulating the data.

2.3. Data collection instruments technique

As an instrument for data collection, the online survey was used, which was based on the questionnaire on working conditions and health in Latin America (National Survey of working conditions) and the Nordic questionnaire [15], adapted to each of the sectors, both industrial and construction. The Microsoft forms virtual platform was used for the definitive collection of the surveys due to the accessible data collection. Direct contact with workers was also avoided, thus avoiding crowds, and reducing the spread of the current pandemic.

2.4. Definition of variables

The variables used in this research that seeks to find the prevalence of low back pain and musculoskeletal symptoms, extracted from the questionnaire on working conditions and health in Latin America and the Nordic questionnaire are:

2.4.1. Variables of the questionnaire on working conditions and health in Latin America

(i) Occupation: administrative, operational; (ii) sex: female, male; (iii) age: ≥20-29, 30-39, 40-≤50; (iv) level of education: primary education, higher education; (v) number of jobs: 1 job, 2-4 jobs; (vi) number of working

hours: 2-14 hours, 41-70 hours; (vii) work sector: industrial, construction; (viii) working time in years: 1-10 years, 11 to 31 years; (ix) type of business contract: fixed, temporary; (x) working day: daytime, rotating; (xi) usual work position: foot: yes, no; (xii) sitting: yes, no; (xiii) walking: yes, no; (xiv) squat: yes, no; (xv) knees: yes, no. (xvi) inclined: yes, no; (xvii) usual work task: (xviii) handling loads: yes, no; (xix) forced postures: yes, no; (xx) exert forces: yes, no; (xxi) reach tools: yes, no; (xxii) regular work time: less than 1 minute: yes, no; (xxiii) greater than 1 minute yes, no; (xxiv) ways of working: working comfortably: yes, no; (xxv) necessary movements: yes, no; (xxvi) change of positions: yes, no.

2.4.2. Variables standardized Nordic questionnaire

Pain 12 months: neck, shoulders, hands-wrist, thoracic spine, lumbar spine, hips-legs, knees, ankles-feet: yes, no.

Pain 7 days: neck, shoulders, hands-wrist, thoracic spine, lumbar spine, hips-legs, knees, ankles-feet: Yes, No; Work disability: neck, shoulders, hands-wrist, spine, lumbar spine, hips-legs, knees, ankles-feet.

2.5. Data processing

The statistical analysis of this study used Epi info version 7 as the leading platform. An analysis of measures of central dispersion was performed on the quantitative variables (mode, median, mean, standard deviation, and variance) of the quantitative variables; For the qualitative variables, absolute and relative frequencies were analyzed.

A detailed statistical analysis was carried out, performing an adequate crossing of variables and establishing a bivariate and multivariate analysis; the quantitative variables were transformed into qualitative ones to continue analyzing the data obtained.

3. Results

According to the data obtained, it can be seen that the majority of the participating workers belonged to the operating sector (74.39%), establishing an approximate relationship of 3 to 1, which could be considered as a possible bias when carrying out an exhaustive comparison of data. The predominant sex was male, with 148 (71.50%). The average age of the workers was established at 42 years, being able to appreciate that the majority of the workers were young adults aged between 20 and 39 years, with a prevalence of 65.22%. Regarding education, 64.73% of the workers have a basic level of education; of these, 124 (80.52%) are operational area employees, and most administrative staff have higher education (81.13%). Most of the participating workers have only one job, 190 (91.76%), are salaried 196 (94.96%), and belong to the industrial sector 145 (70.05%). Concerning the other working conditions, it can be seen that the operational workers are the ones that are primarily at risk since 149 (96.75%) do work standing up, 145 (94.16%) work walking, 146 (94.81%) do the handling of loads, and 147 (95.45%) carry out force activities in their daily work.

Regarding the prevalence of musculoskeletal discomfort, neck pain, shoulder pain, and low back pain were the most prevalent symptoms. After 12 months, chronic low back pain was evidenced in administrative staff (30.19%), in operational staff (44.16%), with a p value <0.07, shoulder pain 41.51% in administrative staff and 69.48% in operational staff, with a value p= 0.14, in which it is evident that there is no statistically significant relationship. At the same time, neck pain has shown a statistical association with a p value <0.01. Osteomuscular symptoms were studied at seven days to corroborate the existence of recent pain, in which neck pain has shown a statistical relationship (p=0.02), where administrative staff (37.74%) have been the most affected.

In the present study, it has been possible to determine that low back pain has been the musculoskeletal symptom with the highest prevalence of incapacity for work during the 12 months. There is a statistically significant relationship (p<0.01), mainly in operational personnel (30.52%).

When analyzing the information, it can be observed that the working conditions associated with the presence of neck pain at 12 months are: belonging to the operational sector (p<0.01), being between 20-39 years of age (p<0.01), having higher education (p<0.01) and in terms of the work structure, carrying out their activities walking (p<0.01) and exerting strength (p<0.01), in terms of low back pain it has not been possible to determine statistical significance, for the appearance of early neck pain at seven days we have to belong to the operating sector (p=0.03), to be female (p=0.02), to be between 20 and 39 years of age (p<0.01), and in As regards the structure of work carrying out forces (p<0.01), as regards low back pain, statistical significance could not be determined. Regarding the presence of incapacity for work at 12 months, it was evidenced that the male sex defines disability due to neck pain (p<0.02), being between 20 and 39 years of age (p<0.01), and in Regarding the work structure, carry out the activities walking (p<0.01) and standing (p=o.03). Regarding work incapacity and low back pain, it has been possible to determine that it is associated with belonging to the operational sector (p<0.01), having an age between 20 - 39 years (p<0.01), having a primary education (p <0.01) and regarding the work structure, handling loads (p<0.01) and performing forces (p<0.01). Although it has been shown that the comparison groups are different, the association between low back pain and work factors could not be determined; work disability has taken on great importance in the study.

When performing simple logistic regression on the variables, occupation 2.36 (CI 1.24-4.47), and age 2.65 (CI 1.29-5.42), are statistically significant with these variables and neck discomfort within the last 12 months. The possibility of developing discomfort in the cervical region is 2.36 times higher in operational workers than in administrative workers and 2.65 times higher if they are between 30 and 39 years of age. Considering the logistic regression of the variables age and work performed with force, they are statistically significant with these variables and discomfort at the shoulders and lumbar spine level. The possibility of developing discomfort at the level of the shoulder region is 2.51 times higher if the workers are between 30 and 39 years of age, and in the lumbar spine, it is 3.61 times higher if the workers are in that age range. In the adjusted model, occupation 2.38 (CI 1.01-5.60) and age 2.33 (CI 1.09-4.96) show a statistically significant association with these variables and neck discomfort within the last 12 months. This corroborates the relationship of these variables with discomfort in the cervical area, as observed in the crude OR.

In simple logistic regression, the variables show occupation 2.13 (CI 1.09-4.19), sex 2.15 (IC1.11-4.15), age 2.31 (CI 1.09-4.86), are statistically significant, with these variables and neck discomfort within of the last seven days. The possibility of developing neck discomfort in the previous seven days is 2.13 times higher in operational workers, 2.15 times higher in males, and 2.31 times higher in workers aged between 30 and 39. Like the variable age 2.51 (CI 1.22-5.13) and shoulder discomfort within the last seven days; such as the variables age 3.61 (CI 1.62-8.14), work performed with force 1.23 (CI 1.41-4.64) and discomfort in the lumbar spine within the last seven days. In the adjusted model, occupation 2.38 (CI 1.01-5.60) and age 2.33 (CI 1.09-4.96) are statistically associated with these variables and neck discomfort in the last seven days. This corroborates these variables' relationship with neck discomfort, as observed in the crude OR.

Regarding the sex variable, 3.16 (CI 1.09-9.15) is statistically significant, with neck discomfort that prevented him from working in the last 12 months. The possibility of developing this work impediment is 3.16 times higher in male workers. However, in the adjusted model, the habitual standing work posture variable is 0.05 (CI 0.01-0.81), and discomfort in the lumbar spine that prevented him from working in the last 12 months demonstrated a protective factor for those who carried out their work in this way.

4. Discussion

The participating population was varied since five companies participated, highlighting a painting company, a hardware company, a poultry company, and a heavy material construction company. These companies carry out different types of activities. Although they are not the same for each company, most of the activities they

share are force majeure, such as the warehouse area, stevedores, and workers. This shows a high prevalence of musculoskeletal symptoms in the lumbar spine (40.58%), followed by pain in the neck (35.74%), shoulders (33.33%), wrist-hands (33.33%), thoracic spine (23.18%), hip- legs (23.18%), knees (21.25%) and ankles and feet (8.21%).

Although the results obtained are not as highly prevalent as in other studies, such as [3], with a 59% prevalence of low back pain related to the global trend (70 to 60%), the results obtained do detail a significant prevalence of low back pain, as well as the study [16], which used the same standardized questionnaire, getting a prevalence of low back pain between the range of 12.7% - 24.6% of the participating countries. A prevalence of low back pain and shoulder pain was demonstrated, although symptoms may be due to several factors which would not be related to each other. However, when making a deeper analysis, a higher percentage of low back pain was manifested in workers (44.16%) and a higher prevalence of neck pain in administrative personnel (50.94%). This trend may possibly be due to the various activities carried out by the workers, which predisposes to the appearance of this symptom (p=0.07). At the same time, the administrative staff performs more office activities in which they are carried out in a sitting and standing position without exerting considerable physical effort (50.94%). These data agree with several studies carried out, such as that of (Sharon Inga, Karen Rubina, 2021), where a high prevalence of low back pain (77%) was highlighted, presenting considerably in construction workers (p<0.001). There is also the study by [10] that obtained a prevalence of low back pain of 55% and the study by [13], which obtained a majority of 48.2% of neck pain in a meat sales and distribution company, which It is predominantly made up of administrative staff.

Neck pain, on the other hand, was also present in our study, where a significant prevalence (35.74%) was highlighted in the administrative staff (50.94%). These data agree with another study carried out in Ecuador, which was carried out on workers from a State University and used the same standardized questionnaire for data collection. In this, all the staff work seated, as in our study, obtaining a high prevalence of (26.68%) [17]. Regarding the sociodemographic factors and the work factors that were related to the appearance of low back pain, we have the male sex (p<0.01) with a CI. 0.54-1.84), to a greater number of paid jobs (p0.03) with a CI. (0.13-1.34), belonging to sectors associated with construction (p 0.03) with a CI. (0.52-1.69) and manipulate charges (p 0.01) with a CI. (1.41-4.64). Data that agrees with several studies carried out such as the study by [11], which determined a statistically significant relationship between low back pain, male gender (p<0.01) and manual handling of loads (p=0.04). This is the case of the study by (Sharon Inga, Karen Rubina, 2021), which established the same statistical relationship between the male sex (p=0.04), greater workload (p<0.01), and belonging to sectors associated with the construction (p<0.001), with the appearance of low back pain; data consistent with this investigation.

In relation to work absenteeism, a statistically significant relationship (p<0.01) was evidenced with low back pain, which in a higher percentage belongs to operational workers (30.92%), before administrative workers (9.43%). No statistical relationship could be found between neck pain and work absenteeism. These data obtained could be visualized in the study by [3], where 43% of the workers had an impediment to work due to the musculoskeletal symptoms presented. The study by [18] also determined a statistical relationship between low back pain and work absenteeism (p<0.001).

Although most studies agree with the data obtained, such as [19], where they established a high prevalence of low back pain in adolescents (39.8%), while our study determined a low percentage of low back pain in young people. According to [20], in addition to determining a low prevalence of low back pain (30.9%), it was also verified that the female sex (60.2%) and in the administrative staff (p=0.01) are discordant data with the present investigation [19].

5. Conclusions

A high percentage of low back pain has been manifested in blue-collar workers, associated with the male sex, with more paid jobs in construction and handling loads. Data that agrees with several studies carried out worldwide establishes a pattern that must be modified to avoid its high prevalence. In addition, it has been possible to demonstrate a high prevalence of neck pain in administrative workers; this could be determined by the working conditions that this type of worker presents. These data show that implementing a standardized questionnaire in Ecuador to obtain statistical data is possible.

Due to the high prevalence of low back pain and neck pain, it is suggested to carry out an educational intervention, both in the operational staff and the administrative staff, to minimize the presence of these symptoms as much as possible and thus reduce the risk of an occupational disease, which will lead to lower productivity and higher health spending. In future work, it is proposed to carry out a more exhaustive study on the subject to delve deeper into the possible risk factors that could generate the appearance of low back pain. These could be physical traits, such as the worker's weight and height, social characteristics, such as coexistence with co-workers, the workload, and the level of job satisfaction perceived by each worker.

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Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Conflicts of Interest

The authors declare no conflict of interest.

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The incidence of cancer at the IESS Hospital in the city of Ambato, Ecuador: a cross-sectional descriptive study

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Abstract

Cancer is one of the leading causes of death worldwide, and its incidence has been increasing in recent years. In this context, this study aims to determine cancer incidence at the IESS Hospital in Ambato, Ecuador, during 2017, through a descriptive cross-sectional approach. The study methodology consisted of reviewing the medical records of patients diagnosed with cancer in the hospital during the mentioned period. The data were statistically analyzed to determine the frequency of cancer cases and describe the affected patients' characteristics. The study results indicate that 114 cases of neoplasms were recorded during the study period, with more cases in women in a ratio of 1.5/1 for men. Breast cancer was the most common type of cancer diagnosed in the hospital. Other common types of cancer include prostate, stomach, and cervical cancer. Additionally, it was found that cancer was more frequent in patients over 60 and in female patients.

Keywords: Cancer, Dysplasia, Medical Record.

La incidencia del cáncer en el Hospital del IESS de la ciudad de Ambato, Ecuador: un estudio descriptivo transversal

Resumen

El cáncer es una de las principales causas de muerte en todo el mundo y su incidencia ha ido en aumento en los últimos años. En este contexto, el presente estudio tiene como objetivo determinar la incidencia del cáncer en el Hospital del IESS de la ciudad de Ambato, Ecuador, durante el año 2017, a través de un enfoque descriptivo transversal. La metodología del estudio consistió en la revisión de los registros médicos de pacientes diagnosticados con cáncer en el hospital durante el período mencionado. Los datos se analizaron estadísticamente para determinar la frecuencia de casos de cáncer y para describir las características de los pacientes afectados. Los resultados del estudio indican que se registraron un total de 114 casos de neoplasias durante el período de estudio, obteniéndose más en mujeres en una proporción de 1,5/1 en relación con los hombres. El cáncer de mama fue el tipo más común de cáncer diagnosticado en el hospital. Otros tipos de cáncer comunes incluyen el cáncer de próstata, el cáncer de estómago y el cáncer de cuello uterino. Además,

se encontró que el cáncer fue más frecuente en pacientes mayores de 60 años y en pacientes de sexo femenino.

Palabras clave: Cáncer, Displasia, Registro Médico.

A incidência do câncer no Hospital do IESS da cidade de Ambato, Equador: um estudo descritivo transversal

Resumo

O câncer é uma das principais causas de morte em todo o mundo e sua incidência tem aumentado nos últimos anos. Neste contexto, o presente estudo tem como objetivo determinar a incidência do câncer no Hospital IESS da cidade de Ambato, Equador, durante o ano de 2017, através de uma abordagem descritiva transversal. A metodologia do estudo consistiu na revisão dos registros médicos de pacientes diagnosticados com câncer no hospital durante o período mencionado. Os dados foram analisados estatisticamente para determinar a frequência de casos de câncer e descrever as características dos pacientes afetados. Os resultados do estudo indicam que foram registrados um total de 114 casos de neoplasias durante o período de estudo, sendo mais comuns em mulheres em uma proporção de 1,5/1 em relação aos homens. O câncer de mama foi o tipo mais comum de câncer diagnosticado no hospital. Outros tipos comuns de câncer incluem câncer de próstata, câncer de estômago e câncer de colo do útero. Além disso, foi constatado que o câncer foi mais frequente em pacientes com mais de 60 anos e em pacientes do sexo feminino.

Palavras-chave: Câncer, Displasia, Registro Médico.

1. Introduction

Cancer is a disease that affects millions of people worldwide, and its incidence and mortality are on the rise [1]. According to a report by the International Agency for Research on Cancer (IARC) of the World Health Organization (WHO), in 2020, it produced 1.4 million deaths, and in 2040 it will increase to 6 million [2]. This increase is partly due to the aging of the population and the adoption of unhealthy lifestyle habits, such as smoking, excessive alcohol consumption, unhealthy diet, and lack of exercise. Developing countries are the most affected by this trend, as they often lack the necessary training, prevention, and equipment to cope with the increasing number of cancer cases [3].

In South America, cancer cases are also on the rise, with an 88% increase forecast over the next 20 years. Countries in the region face similar challenges to developing countries, such as a lack of resources and a higher incidence of unhealthy lifestyle habits. Colombia and Ecuador are expected to be the most affected countries, with a 132% and 131% increase in cancer mortality, respectively. South American countries also face challenges regarding resources and funding for research and development of more effective cancer treatments. A lack of investment in research and development can impede the identification of new therapies and technologies that can help prevent, diagnose and treat cancer more effectively [4].

At the local level, the National Tumor Registry (RNT) has become an essential tool for understanding cancer incidence and presentation in Ecuador. In addition, the National Institute of Statistics and Census (INEC) provides information on the growing importance of cancer in the country as a cause of mortality. Despite these efforts, a more significant commitment to cancer prevention and early detection is needed to address the growing burden of this disease [5]. Another challenge in the fight against cancer in Ecuador is the accessibility and affordability of cancer treatments. The costs of treatments and medications can be prohibitive for many

people in the country, limiting access to cancer care and treatment [6]. Policies and programs are needed to ensure that all Ecuadorians have access to cancer care and treatment, regardless of their ability to pay [7].

This article consists of four sections, including the introduction in section 1. The methodology is presented in section 2, and the results in section 3.

2. Methodology

2.1. Type and design of research

This was a non-experimental study because the variables were not manipulated, but the information was collected through observation. Likewise, it was exploratory because it was the first time it was carried out in this place. We sought general and preliminary information on cancer incidence in the IESS Ambato hospital. In addition, it was descriptive because the incidence of cancer was analyzed about different variables, such as types of cancer, age, gender, days of hospitalization, the evolution of patients, presumptive and confirmatory diagnosis, histopathology, and mortality. It was cross-sectional because the information was collected at a specific time, i.e., during 2017, and patients were not followed up.

2.2. Participants

Patients who were treated at the IESS Hospital in Ambato in 2017 and who presented some neoplasia.

2.3. Inclusion and Exclusion Criteria

The inclusion criteria are (i) patients with a confirmed diagnosis of cancer, according to hospital medical records; (ii) Patients who have received treatment for cancer at the hospital; (iii) Patients who have been referred to the hospital for cancer treatment; (iv) Patients who have been diagnosed with cancer at the hospital from routine screening or check-ups; (v) Patients who have been diagnosed with any type of cancer, including solid and hematological cancers; (vi) Patients who have been diagnosed with cancer at any stage of the disease. And among the exclusion criteria: (i) Patients with other severe medical conditions.

2.4. Data collection techniques and instruments

For the research, the collection and analysis of statistical information provided by the statistics department of the institution were performed. In addition, the classification, prioritization, and identification of information related to ICD 10 of malignant and benign neoplasms in 2017. Also, descriptive and inferential statistics for the 114 cases structured under the following analysis criteria: (i) Incidence of cancer (by the ten main types of neoplasms); (ii) Types of cancer by age; (iii) Types of cancer by gender; (iv) Days of hospitalization; (v) Evolution of patients; (vi) Presumptive versus confirmatory diagnosis; (vii) Histopathological; (viii) Mortality by gender and age.

3. Results

This study analyzed cancer incidence in the Ambato General Hospital of the IESS in 2017. A total of 184 cases of neoplasms, both benign and malignant, were found, and the ten most prevalent were identified. The results showed that the neoplasm with the highest trend in this health unit was a benign ovarian tumor, followed by a malignant prostate tumor, encephalon, and stomach tumor. Benign breast tumors, endometrial gland hyperplasia, and malignant tumor of the thyroid gland, rectum, breast, and cervix were also observed. Notably, many benign tumors are coded with ICD-10 cancer or malignant neoplasm for a more specific assessment.

The tendency to develop cancer within the ten main types of neoplasms, and of the 114 prevalent cases, more were obtained in women in a ratio of 1.5/1 to men, as shown in Table 1. The age group with the highest incidence of malignant or benign neoplasm is adults and the elderly, with 38% each. The types of neoplasms that prevail in adults are benign ovarian tumors, endometrial hyperplasia, and malignant tumor of the thyroid gland. In older adults, malignant prostate, stomach, and rectum tumors prevail. On the other hand, in young adults, there is a 20% prevalence of benign ovarian tumors, benign breast tumors, and malignant brain tumors.

Table 1. Incidence of cancer in the General Hospital of IESS Ambato, according to sex. [8].

N°	Type of cancer	Female Sex (F)	Male Sex (M)	% F	% M	Total
1	Benign ovarian tumor	20	0	17,54	0,00	20
2	Malignant prostate tumor	0	17	0,00	14,91	17
3	Malignant brain tumor	5	10	4,39	8,77	15
4	Malignant tumor of the stomach	5	7	4,39	6,14	12
5	Benign breast tumor	7	4	6,14	3,51	11
6	Endometrial gland hyperplasia	10	0	8,77	0,00	10
7	Malignant tumor of the thyroid gland	4	6	3,51	5,26	10
8	Malignant tumor of the rectum	5	2	4,39	1,75	7
9	Malignant breast tumor	7	0	6,14	0,00	7
10	Malignant tumor of the cervix	5	0	4,39	0,00	5
	TOTAL	**68**	**46**	**59,65**	**40,35**	**114**

Regarding the duration of treatment, patients remain in the hospital for an average of 61 to 75 days, representing 36% of the total, followed by 31 to 45 days, corresponding 27%, and 46 to 60 days, representing 25%. After this, patients are kept under permanent check-ups or are transferred according to the level of complexity. Of the 114 cases of hospitalized patients with cancer detected in the Ambato general hospital of the IESS during 2017, 14 died, representing 8% of the total.

When analyzing the statistics of the deceased according to age groups, the group of older adults has 71% in the function of 10 deceased persons, followed by adult and young adults at 14%. Regarding gender, 78% of the total number of men died, 14.3% in adults, and 64.3% in older adults, with prostate, brain, and stomach cancer is the most prevalent. In women, death was 21%, with 14.3% in young adults and 7% in older adults, with brain, stomach, and cervical cancer being the most prevalent.

According to Table 2, 80% of patients with suspected cancer underwent biopsies that confirmed the initial diagnosis, while the remaining 20% had no diagnostic test results. A critical analysis explains why cases of benign tumors are coded as benign neoplasms in ICD-10. Based on the anamnesis and the symptomatology presented by the patient, the physician who performed the evaluation considered them neoplasms to achieve the corresponding pathological analysis. Furthermore, in some cases, they are regarded as precursors of cancer. Of the 41 cases that presented benign breast tumors, benign ovarian tumors, and endometrial gland hyperplasia, 14 had a definitive diagnosis of malignant tumor after the corresponding examinations. Of these 14, 6 corresponded to the initial 41 cases, which led to the death of one of the patients. Four cases did not receive a definitive diagnosis of cancer.

Table 2. Cancer type vs. histopathological [8].

N°	Type of cancer	Biopsy	
		Yes	No
1	Benign ovarian tumor	15	5
2	Malignant prostate tumor	10	6
3	Malignant brain tumor	10	5
4	Malignant tumor of the stomach	12	0
5	Benign breast tumor	8	3
6	Endometrial gland hyperplasia	8	2
7	Malignant tumor of the thyroid gland	9	1
8	Malignant tumor of the rectum	7	0
9	Malignant breast tumor	7	0
10	Malignant tumor of the cervix	6	0
	TOTAL	**92→80%**	**22→20%**

Overall, the results indicate that early detection and diagnosis are critical in preventing and treating cancer. Appropriate diagnostic tools, such as biopsy, are crucial in confirming an initial diagnosis of cancer and avoiding delays in treatment. Furthermore, identifying benign neoplasms as precursors to cancer highlights the importance of careful evaluation and close follow-up of these patients. In summary, these results underscore the importance of continued vigilance and care in cancer detection and treatment.

4. Discusion

Cancer continues to be one of the main public health problems worldwide, and the data presented in the text support this claim. According to SOLCA and the General Hospital of IESS Ambato reports, certain types of cancer, such as thyroid, breast, and skin cancer, have recently remained high in Tungurahua. In addition, the incidence of prostate and cervical cancer, although not as high as other types of cancer, continues to be of concern [9].

It is important to note that the incidence and mortality from some types of cancer are steadily increasing worldwide, especially in low- and middle-income countries. The Global Initiative for Cancer Registry Development (GICR) was created in response to the inequalities in data on this pathology in low- and middle-income countries. The fact that Ecuador belongs to the Latin American Node allows cancer control actions to be adopted and implemented in the region.

In the specific case of the General Hospital of IESS Ambato, data reveal that the prevalence of ovarian, prostate, brain, stomach, breast, and thyroid cancer is high. In addition, cancer incidence is higher in women and older adults. These results are consistent with worldwide data showing that cancer is more common in older people and that women have a higher incidence of cancer in some organs.

Regarding the practical implications of these results, health authorities must implement cancer prevention and control programs, especially in higher-risk groups. In addition, public awareness campaigns on cancer risk factors and the importance of early detection are required. It is important to emphasize that early cancer detection is fundamental to increasing survival rates and reducing mortality from this disease.

5. Conclusion

Cancer is a complex disease that affects millions of people worldwide. The different causes of cancer, such as smoking, chemical exposure, and genetic predisposition, have been explored, and the importance of prevention and early detection has been highlighted. The present research provided a detailed overview of cancer, its causes, symptoms, and currently available treatments. The different types of cancer, their possible causes, and the diagnostic methods used to detect the disease were highlighted. In addition, the importance of prevention and early diagnosis of cancer to increase the chances of survival was emphasized.

Likewise, the different treatment options available to treat cancer, such as surgery, radiotherapy, and chemotherapy, were identified. Accurate cancer statistics, including mortality and survival rates, have been presented, and it has been determined that cancer incidence has increased worldwide. In addition, it has been noted that cancer prevalence varies by geographic region, gender, and age.

It is essential to highlight the need for a multidisciplinary approach to address cancer disease. We conclude the high value of collaboration between clinicians, researchers, patients, and civil society organizations to improve cancer patients' quality of life and advance research and treatment of the disease. A comprehensive literature review was conducted in the present investigation; however, the results presented are not in-depth, and there are limitations. Future work will address issues related to equity in medical care and access to advanced cancer diagnosis and treatment technology.

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