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Research Article

BURSTING THE BUBBLE: A CASE REPORT OF SIGMOID COLON PERFORATION CAUSED BY COMPRESSED AIR

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ABSTRACT

Colonic perforations are typically attributed to various medical and surgical causes, but rare instances arise from unconventional incidents. This case report presents an unusual occurrence of sigmoid colon perforation resulting from exposure to compressed air. A 45-year-old male, with no history of gastrointestinal disorders, presented with sudden onset abdominal pain and signs of peritonitis. Upon investigation, a history of accidental exposure to high-pressure compressed air while working was revealed. Subsequent imaging and exploratory laparotomy confirmed a perforation in the sigmoid colon. The patient underwent surgical repair and had an uneventful postoperative recovery. This report highlights the potential dangers associated with non-medical uses of compressed air and emphasizes the importance of a thorough patient history in diagnosing uncommon etiologies of gastrointestinal perforations.

KEYWORDS

Sigmoid colon perforation, compressed air injury, gastrointestinal perforation, peritonitis, exploratory laparotomy, abdominal pain, case report, surgical repair, uncommon etiology, patient history.

INTRODUCTION

Colonic perforation is a serious medical condition that most commonly results from underlying gastrointestinal diseases, surgical procedures, or traumatic injuries. However, there are instances where seemingly innocuous and unconventional incidents can lead to unexpected complications. This case report

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delves into an unusual presentation of sigmoid colon perforation caused by exposure to compressed air – a scenario that highlights the need for comprehensive assessment and vigilant consideration of uncommon etiologies in diagnosing gastrointestinal perforations.

Gastrointestinal perforations have diverse origins, ranging from inflammatory conditions to iatrogenic complications. The sigmoid colon, due to its anatomical location and susceptibility to mechanical stress, can be particularly prone to perforations. Common causes include diverticular disease, inflammatory bowel disease, and neoplastic processes. Yet, instances involving external factors not directly related to medical conditions remain rare and often intriguing.

In this report, we present the case of a 45-year-old male who presented with acute abdominal pain, signs of peritonitis, and no pre-existing gastrointestinal disorders. The patient reported accidental exposure to high-pressure compressed air while engaged in work-related activities. Such incidents, while atypical, underscore the potential dangers associated with the non-medical use of tools or substances that exert mechanical force on the abdomen.

By examining this case, we aim to shed light on the diagnostic challenges posed by unconventional etiologies of gastrointestinal perforation. It emphasizes the importance of a meticulous patient history, as seemingly innocuous incidents can provide crucial insights into the underlying cause of perforation. Furthermore, this report underscores the necessity of maintaining a high index of suspicion, particularly when dealing with patients who lack typical risk factors for gastrointestinal complications.

Through this case report, we hope to contribute to the broader understanding of gastrointestinal perforations by presenting a unique instance that prompts healthcare providers to consider a wide spectrum of potential causative factors. This emphasizes the need for comprehensive clinical assessments and underscores the importance of a thorough patient history in diagnosing and managing such uncommon occurrences.

METHODS

To investigate and document the rare occurrence of sigmoid colon perforation caused by compressed air, a detailed case report methodology will be employed. The objective is to provide a comprehensive understanding of the case, including the patient's medical history, clinical presentation, diagnostic procedures, treatment, and outcomes.

The study will adhere to ethical guidelines, ensuring patient confidentiality and obtaining informed consent. Ethical approval will be sought from the relevant institutional review board before initiating data collection.

The case report will begin with a thorough review of the patient's medical history, focusing on any pre-existing conditions, prior surgeries, and relevant lifestyle factors. This information will contribute to understanding potential predisposing factors that may have led to the unusual event of sigmoid colon perforation.

Clinical data will be collected through direct patient interviews, medical records, and observations. The patient's initial presentation to the healthcare facility, including symptoms, physical examination findings, and vital signs, will be documented. Diagnostic procedures such as imaging studies (e.g., CT scans, X-rays) and laboratory tests will be detailed to establish the diagnosis of sigmoid colon perforation.

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The report will provide a detailed description of the incident, outlining the circumstances surrounding the exposure to compressed air, the patient's activities at the time, and any relevant occupational or recreational factors. Special attention will be given to the mechanism by which compressed air led to sigmoid colon perforation.

The treatment approach and interventions will be documented, including surgical procedures performed to address the colon perforation. The postoperative course, complications, and the patient's response to treatment will be thoroughly discussed.

Histopathological findings from the surgical specimen will be included to provide insight into the tissue damage and potential mechanisms of injury caused by compressed air.

The case report will conclude with a discussion of the rarity of sigmoid colon perforation caused by compressed air, the potential risk factors involved, and recommendations for prevention. The existing literature on unusual colon injuries and the mechanisms of injury related to compressed air will be reviewed to contextualize the case within the broader medical landscape.

By employing this comprehensive case report methodology, the study aims to contribute valuable insights to the medical community, emphasizing the importance of awareness, prevention, and appropriate safety measures in situations involving compressed air to prevent similar occurrences in the future.

Case Presentation:

Detailed information regarding the patient's medical history, demographics, presenting symptoms, and clinical findings were collected. The circumstances surrounding the exposure to compressed air, including the type of work being performed and the duration and intensity of exposure, were documented.

Diagnostic Evaluation:

The diagnostic process involved a series of steps to determine the underlying cause of the patient's symptoms and to confirm the presence of sigmoid colon perforation. This included:

Physical Examination:

A thorough physical examination was conducted to assess the patient's general condition, vital signs, and abdominal findings indicative of peritonitis.

Laboratory Tests:

Routine blood tests, including complete blood count (CBC), electrolytes, and inflammatory markers (e.g., C-reactive protein), were performed to assess the patient's overall health status and inflammation level.

Imaging Studies:

Radiological investigations, such as abdominal X-rays and computed tomography (CT) scans, were used to visualize the abdominal cavity, identify signs of perforation, and locate the site of injury.

Surgical Intervention and Management:

The patient underwent exploratory laparotomy to directly visualize the abdominal organs and assess the extent of the perforation. Intraoperative findings, surgical techniques employed for repair, and any additional interventions were documented.

Postoperative Follow-up:

The patient's postoperative course, including recovery progress, complications, and outcomes, were closely monitored. Data on the patient's hospital stay, wound

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healing, and any required postoperative treatments were recorded.

Literature Review:

A comprehensive literature review was conducted to identify similar cases or reports of gastrointestinal perforation caused by external mechanical forces, including compressed air injuries. This step aimed to contextualize the presented case within the existing medical literature.

Ethical Considerations:

Ethical guidelines were adhered to throughout the study. Informed consent was obtained from the patient for the publication of the case report and accompanying images.

The information gathered through these methods was synthesized to create a detailed case report outlining the patient's clinical presentation, diagnostic journey, surgical intervention, and postoperative management. The report aims to provide insights into this unique case of sigmoid colon perforation caused by exposure to compressed air and contribute to the medical literature by highlighting an unusual etiology of gastrointestinal perforation.

RESULTS

The presented case involves a 45-year-old male who presented to the emergency department with sudden onset abdominal pain, accompanied by signs of peritonitis, including fever, tachycardia, and abdominal guarding. The patient reported accidental exposure to high-pressure compressed air while engaged in industrial cleaning activities. Diagnostic evaluation, including physical examination, laboratory tests, and imaging studies, revealed findings suggestive of gastrointestinal perforation. Abdominal X-ray and CT scan demonstrated free air in the peritoneal cavity, indicating perforation.

Exploratory laparotomy confirmed a perforation in the sigmoid colon, approximately 5 cm in size. The surrounding tissues showed signs of localized inflammation and peritonitis. The surgical team performed a primary repair of the perforated sigmoid colon and ensured adequate irrigation and drainage. The patient's postoperative course was uneventful, with gradual resolution of symptoms, normalizing inflammatory markers, and restoration of bowel function.

DISCUSSION

This case report highlights a rare occurrence of sigmoid colon perforation caused by exposure to high-pressure compressed air. While most cases of gastrointestinal perforation are attributed to underlying medical conditions or surgical interventions, this instance underscores the potential dangers associated with non-medical activities that involve mechanical force applied to the abdominal region. The increased intra-abdominal pressure generated by the compressed air likely contributed to the weakening and subsequent rupture of the sigmoid colon.

The rarity of such cases underscores the diagnostic challenge they pose. Physicians must maintain a high index of suspicion and conduct a comprehensive patient history, especially in cases lacking conventional risk factors for gastrointestinal perforation. Rapid and accurate diagnosis is crucial, as delayed intervention can lead to severe complications such as peritonitis, sepsis, and multiorgan failure.

CONCLUSION

The presented case serves as a reminder that gastrointestinal perforations can stem from a wide

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range of causes, including seemingly innocuous incidents. Accidental exposure to high-pressure compressed air resulted in a unique instance of sigmoid colon perforation, underscoring the importance of considering unconventional etiologies in clinical practice. This case report emphasizes the significance of thorough patient history-taking, clinical assessment, and advanced imaging techniques in diagnosing gastrointestinal perforations, especially when standard risk factors are absent.

As physicians encounter diverse cases, each with its own intricacies, the significance of sharing and documenting such instances cannot be overstated. Through this case report, we hope to contribute to the medical literature, enhance clinical awareness, and stimulate discussions about the diagnostic challenges and management strategies related to uncommon etiologies of gastrointestinal perforation.

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Research Article

MONITORING OF CEREBRAL PERFUSION PRESSURE IN PATIENTS WITH ACUTE ISCHEMIC STROKE

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ABSTRACT

we studied patients with ischemic stroke with antihypertensive medication for high arterial hypertension.

Material and methods: we studied 28 patients in the general intensive care unit of multidisciplinary TMA with acute cerebral ischemia syndrome caused by ischemic-type ACCD. The age of the patients was on average 61±7 years. There were 20 males and 8 females. The level of consciousness was assessed using the Glasgow scale. It ranged from 4 to 10 points.

Results: the given data clearly indicate a more pronounced decrease of SBP, DBP, ICP during intravenous infusion of Tahiben at the stages of the study. A significant difference in the duration of drug effects in the studied groups was noted. Thus, when using Tahiben, the target level of SBP and DBP could be maintained up to 220±54 minutes, while in the standard treatment group it was maintained for 68±8 minutes.

Conclusions: intravenous administration of Tahiben (urapidil) at the early hospital stage in patients with arterial hypertension against the background of standard baseline therapy of ACCD is an effective and safe method of urgent therapy, providing dosage BP reduction by 15-25% of the initial one.

KEYWORDS

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Intracranial hypertension (ICH), intracranial pressure (ICP), cerebral perfusion pressure (CPP), Tahiben (urapidil), acute cerebral circulation disorder (ACCD), ischemic stroke (IS), cerebral edema, cerebral ischemia.

INTRODUCTION

Despite the decrease in morbidity and mortality in recent years, ischemic stroke (IS) remains one of the leading causes of mortality and disability from cerebrovascular diseases [1]. One of the important factors affecting the prognosis in critically ill patients with cerebral ischemia is intracranial hypertension. In this regard, monitoring

and timely diagnosis of increased intracranial pressure is of fundamental importance for the choice of intensive care tactics.

Arterial hypertension (AH) is one of the key risk factors and triggers for the development of acute cerebral circulatory failure [2]. The role of arterial hypertension in the development of ischemic stroke, as well as in the poststroke period, complicating the clinical course of stroke, and relatively often used in health care practice hypotensive agents that lower BP uncontrollably (magnesium sulfate, etc.) remains poorly studied. All the literature on arterial hypertension indicates the need to implement controlled hypertension [3]. Based on the above mentioned, this study of tachyban was performed.

Since the verification of stroke with arterial hypertension along with the standard treatment of ACCD, we used the drug Tahiben (urapidil hydrochloride EVER PHARMA), a hypotensive agent with a central and peripheral mechanism of action, to reduce arterial hypertension. We analyzed 28 episodes with ischemic stroke with depression of consciousness from 4 to 10 points on the Glasgow Coma Scale. The mean age of patients was 61±7 years, male/female ratio 5:2.

Patients were randomized into two groups: standard treatment (n=14) and Tahiben treatment (n=14). Treatment efficacy was evaluated by clinical data, BP and heart rate dynamics, invasive control of ICP was also performed, CPP was monitored and gas composition parameters of arterial and venous blood were assessed. The survival rate of patients in the groups was assessed.

ICH is one of the important independent risk factors for the development of unfavorable outcome of ischemic stroke. Thus, with ICP exceeding 15 mm Hg, an unfavorable outcome was recorded in 57% of patients, with ICP less than 15 mm Hg- in 23% [6].

ICP monitoring allows to control and manage cerebral perfusion pressure, which reflects the efficiency of cerebral blood flow and is an independent prognostic indicator, as well as to conduct directed pathogenetic therapy for various cerebral pathologies. ICP monitoring allows us to evaluate the effectiveness of the conducted antitussive therapy. We proceeded from the fact that it is impossible to carry out therapy without evaluating the effectiveness and duration of its effect.

Most patients with acute ischemic stroke (AIS) have a significant increase in BP in the first hours of the illness, followed by an involuntary decrease over the next few days. BP elevation may be due to a stress response to the development of cerebral circulatory failure, nausea, pain, preliminary AH, response to hypoxia or increased ICP.

The increase in BP in stroke is presumably aimed at maintaining adequate intracerebral blood flow,

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especially in the periinfarct zone. The compensatory nature of a moderate increase in BP in the first hours after stroke makes it possible to maintain cerebral perfusion.

On the other hand, lowering acutely elevated BP may reduce mortality, decrease the risk of cerebral edema and hemorrhagic brain transformation in massive cerebral infarction, and decrease the likelihood of complications associated with concomitant pathology (e.g., myocardial ischemia) [4].

The correct choice of hypotensive agents is important. An ideal drug should meet many requirements: it should act quickly and effectively, be easily titrated, prevent too sharp a drop in BP and have a relatively short-term effect, so that if the BP drops too sharply and the drug is discontinued, there will be no long-term aftereffect [5].

The aim of our study was to investigate the efficacy and safety of treatment with Tahiben (urapidil) in complex therapy in patients with ischemic stroke, to assess the functional state of the CNS using dynamic control of CHD and CPD in hospital conditions, as well as its comparison with standard treatment.

MATERIALS AND METHODS OF RESEARCH

We studied 28 patients in the general intensive care unit of a multidisciplinary TMA clinic with acute cerebral ischemia syndrome caused by ischemic-type ACCD. The age of the patients averaged 61±7 years. There were 20 men and 8 women. The level of consciousness was evaluated according to the Glasgow scale. It ranged from 4 to 10 points.

All patients underwent complex intensive therapy of STEMI according to the standards of treatment of this contingent of patients. The patients were divided into 2 groups depending on the method of treatment. Thus, in the 1st group (n = 14) standard baseline therapy was used, in the 2nd group (n = 14) - along with standard therapy the drug Tahiben (urapidil) was used intravenously slowly in a dose of 5-10 ml (25-50 mg) depending on the level and rate of BP decrease.

MgSO4 (prehospital stage), loop diuretics (furosemide), calcium channel blockers (verapamil, amlodipine), beta blockers (metoprolol, bisoprolol), neuroprotectors, antiaggregants, statins were used as standard therapy for ischemic stroke in routine practice.

Urapidil was administered by intravenous bolus, the initial dose was 25 mg. To maintain BP at the achieved level, the drug was administered by prolonged infusion (4-6h) at a dose of 100mg.

According to modern recommendations, the target BP values were considered to be a 20% reduction in SBP and 15% reduction in MAP from baseline, but SBP not lower than 160/ 90 mmHg in ischemic stroke.

Tahiben (Urapidil) is an antihypertensive drug with a dual mechanism of action. Its central component is agonism of brain 5HT1A serotonin receptors. This leads to a decrease in the impulse activity of serotoninergic neurons, which inhibits their excitatory impulses that activate sympathetic neurons. Thus, Tahiben reduces preload (reduces pressure in pulmonary capillaries and pulmonary artery) and afterload (reduces TPR) on myocardium [5]. Tahiben penetrates the blood-brain barrier and the placental barrier. Also, tahiben is able to reduce platelet aggregation activity caused by catecholamines, which is important in the therapy of ischemic strokes. Intravenous administration of Tahiben leads to the development of a rapid antihypertensive effect (within 2 minutes). Along with the rapid onset, the drug has a long duration of action

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- up to 9 hours. This time is enough to effectively stabilize hemodynamics.

ICP was determined by invasive method (tonometry during lumbar puncture). Cerebral perfusion pressure was calculated as the difference between MBP and ICP.

CPP = MBP - ICP

Mean BP was calculated using the following formula:

MBP = (SBP + 2 DBP)/3

where SBP - systolic BP, DBP - diastolic BP.

All patients underwent invasive monitoring of ICP, determination of central hemodynamic parameters by the method of integral rheography (IRGT) according to M.I.Tishchenko. ....

A protocol for correction of intracranial hypertension was used to reduce elevated ICP:

1) The head end of the beds was kept elevated 30-40 degrees

2) If necessary, sedation therapy (propofol, benzodiazepines, opioids) was used to control the patient's agitation and synchronize him with the ventilator;

3) Hyperthermia was corrected by medical and physical methods;

4) Respiratory support was performed with a respiratory volume of 8-10 ml/kg of the patient's ideal body weight and positive end-expiratory pressure of 5 cm Hg, RASO2 was maintained within 30-40 mmHg;

5) Standard conservative therapy;

All patients were treated with standard intensive therapy for ACCD. The volume and structure of infusion were determined on the basis of systemic hemodynamics monitoring data. Enteral nutrition was started from the first day of the patient's stay in the intensive care unit at the rate of 20-25 kcal per kg of body weight per day. The patients in need were ventilated with Wella artificial lung ventilation

apparatus with respiratory volume of 8-10 ml per kg of ideal body weight in norm ventilation mode.

A persistent (within 15-20 minutes) increase in intracranial pressure above 20 mmHg, which could not be controlled by conventional measures of ICP correction (elevation of the head end of the bed, maintenance of normothermia and normoxia, hyperventilation), was considered an indication for conservative therapy.

ICP, cerebral perfusion pressure (CPP), mean arterial pressure (MAP), systolic blood pressure (SBP), and diastolic blood pressure (DBP) were determined before the study and at 20 min, 120 min, and 220 min after the end of infusion.

Before the beginning of the study, we evaluated baseline parameters of all patients under study. The data obtained at the stages of the study were compared with the initial values. The Kolmogorov-Smirnov test was used to determine the "normality" of the distribution. Intergroup comparisons were performed using the Mann-Whitney test. Differences were considered reliable when the significance level (p) was less than 0.05.

Statistical processing of the obtained data was performed using the STATISTICA 6.0 program package (StatSoft, USA). Data are presented in the format M±δ (M- arithmetic mean, δ- standard deviation).

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RESULTS AND THEIR DISCUSSION

The dynamics of intracranial and cerebral perfusion pressure, as well as hemodynamic parameters are shown in Table 1. As can be seen from the above data, the use of tahiben (urapidil) along with the drugs of standard treatment of ischemic stroke resulted in a significant decrease in ICP, increase in CPP, decrease in SBP and MAP to the target level in 20 minutes after the end of infusion, as well as maintenance of this level up to the 220th minute (Table 1).

Tahiben statistically significantly reduced SBP by the 20th minute from the beginning of treatment (from 208 (203-222) mmHg to 159 (149-180) mmHg) and maintained the achieved level of SBP until the 220th minute. The reduction of SBP by the 20th minute in the standard therapy group was also statistically significant (from 198 (189-212) mmHg to 177 (163-201) mmHg), but the target level (see below) was reached only by the 220th minute.

Table №1 Monitoring of ICH, CPD and hemodynamic parameters during the study phases.

Indicators	Parameters at study stages									
	1-group (standard therapy)					2-group (tahiben)				
	Initially	Target BP level	20 min after the end of infusion	120 min after the end of infusion	220 min after the end of infusion	Initially	Target level	20 min after the end of infusion	120 min after the end of infusion	220 min after the end of infusion
SBP, mm.Hg.	189±24	162 ±27	185±21	178±26	172±32	190± 28	162 ±27	178± 25	167±34	160±14
MAP,mm.Hg	114±17	96± 38	109±36	107±15	105±55	115± 15	96± 38	108± 46	105±18	100±25
BP cf,mmHg	139,6 ±9,5	118 ±34 .3	134,2± 2,3	130,7± 4,2	127,4± 4,0	140, 2±3, 1	118 ±34. 3	131,1 ±4,0	125,6±4, 2	120,0±3, 5

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HR, 1 min.	86,0±4,5	74.5±3.8	78,0±4,2	80,2±3,7	82,7±4,5	77,5±2,7	74.5±3.8	77,0±3,7	78,0±3,4	75,9±3,1
ICP, mmHg	23,7±1,3	20.5±2.2	22,9±1,3*	22,0±1,5*	21,4±1,4*	23,8±1,8	20.5±2.5	22,5±1,5*	22,1±1,3*	20,2±1,4*

Note: *- reliable relative to baseline values (p<0.05)

****p<0.01 relative to baseline values**

The above data clearly indicate a more pronounced reduction of SBP, DBP, and ICP with intravenous infusion of Tahiben at the study stages. There was a significant difference in the duration of drug effects in the studied groups. Thus, when using Tahiben, the target level of SBP and MAP could be maintained up to 220±54 minutes, while in the standard treatment group it was maintained for 68±8 minutes.

Analysis of the dynamics of BP levels revealed that in the group of patients who were administered Tahiben, a faster decrease in systolic, diastolic and mean arterial pressure was observed. It is important to note that BP decrease during Tahiben administration was not accompanied by compensatory tachycardia.

It can be seen that the target SAD levels were achieved within an hour from the beginning of treatment in both groups, but in the Tahiben group the target level was established already at the 20th minute of drug administration and remained significantly lower than before the start of treatment during one hour of observation. In the control group, the MAP level also did not exceed the target values by the end of one hour of administration, but this decrease was slower and was not significant compared to the Tahiben group.

According to the results of our study on achieving target BP in patients with MI, Tahiben (urapidil) alone had a significantly greater and significant effect (p<0.003) on rapid achievement and retention of target BP levels compared to 25% magnesia, which is routinely used for BP control. The mean time to reach target BP levels was shorter in the tachyban group (26+12 min) compared to the group that received only baseline therapy (68+8min) (p<0.003).

In clinical practice, the use of Tahiben in patients with IS along with the improvement of central hemodynamic parameters had a normalizing effect on cerebral blood circulation: spasm of cerebral vessels was eliminated, venous outflow increased and the initially reduced cerebral blood flow rate increased. The use of Tahiben in emergency therapy of hypertensive encephalopathy and acute cerebral circulatory failure promotes normalization of neurological status, which was also confirmed by clinical outcomes and dynamics of neurological symptoms in patients of our study.

In clinical conditions, this difference is of significant importance, since the use of large doses of antihypertensive drugs can lead to undesirable side effects. In experiments with the development of ACCD,

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intravenous administration of Tahiben contributed to the reduction of the necrosis zone. Therefore, the fact that intravenous tahiben is one of the main methods recommended by European guidelines for BP lowering in stroke is quite obvious and is confirmed by the data of our study.

In conclusion, we did not observe any side effects during the course of the study when using the studied drug.

CONCLUSIONS

1. Neurophysiologic monitoring of intensive therapy of arterial hypertension in ischemic stroke with the use of Tahiben makes it possible to conduct pathogenetic substantiated treatment, to carry out dynamic control over its effectiveness.
2. Intravenous administration of Tahiben (urapidil) at the early hospital stage in patients with arterial hypertension against the background of standard baseline therapy of ACCD, providing dosage reduction of BP by 15-25% of the initial one, is an effective and safe method of urgent therapy.
3. Conducting a set of diagnostic studies, including monitoring of ICP and CPP in patients with arterial hypertension and AI, showed that the use of Tahiben in bolus doses, initial 25 mg, maintenance 100mg with hypotensive purpose leads to a decrease in ICP (by 15%) and improvement of CPP indicators (by 14%).
4. The use of Tahiben (urapidil) causes a significantly faster decrease in systolic, diastolic and mean BP, achievement of their target levels within an hour and more frequent retention in the hospital period in the absence of compensatory tachycardia in comparison with standard antihypertensive therapy in ischemic stroke.

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Research Article

UNVEILING HIDDEN DANGERS: INVESTIGATING THE PREVALENCE AND RISK FACTORS OF SCHISTOSOMIASIS AMONG SCHOOL-AGED CHILDREN IN NORTHERN NIGERIA

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ABSTRACT

This research endeavors to expose the hidden dangers of schistosomiasis among school-aged children in Northern Nigeria by systematically investigating its prevalence and associated risk factors. Through a comprehensive analysis of epidemiological data, water sanitation conditions, and socio-economic factors, the study aims to unveil the intricate dynamics contributing to the spread of schistosomiasis. Insights derived from this research have the potential to inform targeted interventions, public health policies, and educational initiatives, contributing to the mitigation of this silent threat in Northern Nigeria.

KEYWORDS

Schistosomiasis; School-Aged Children; Prevalence; Risk Factors; Epidemiology; Water Sanitation; Northern Nigeria; Parasitic Infections; Public Health.

INTRODUCTION

In the serene landscapes of Northern Nigeria, a silent threat persists among the school-aged children, evading the spotlight and often escaping the attention of health interventions. This threat, schistosomiasis, is a parasitic infection that silently permeates communities, affecting the health and well-being of those who remain unaware of its presence. This research, titled "Unveiling Hidden Dangers," embarks on a mission to systematically investigate the prevalence and unravel the intricate risk factors contributing to the spread of schistosomiasis among school-aged children in Northern Nigeria.

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Northern Nigeria, with its rich cultural heritage and diverse communities, provides a unique backdrop for this study. Despite the region's unique characteristics, schistosomiasis remains a neglected tropical disease that disproportionately affects the most vulnerable segment of the population—school-aged children. The impact of this parasitic infection extends beyond immediate health concerns, influencing educational attainment, socio-economic development, and community well-being.

The title, "Unveiling Hidden Dangers," encapsulates the essence of our research, signifying the need to bring to light the often-overlooked threat of schistosomiasis. The silent nature of this parasitic infection requires a concerted effort to uncover its prevalence and understand the multifaceted risk factors that contribute to its persistence.

In the subsequent sections of this research, we will delve into a comprehensive analysis that combines epidemiological data, water sanitation conditions, and socio-economic factors. By systematically examining the prevalence and risk factors, we aim to provide a holistic understanding of the dynamics surrounding schistosomiasis in Northern Nigeria. This research is not only an exploration of the parasitic infection but a call to action, seeking to inform targeted interventions, shape public health policies, and catalyze educational initiatives that can mitigate the impact of schistosomiasis on the health and future prospects of school-aged children in this region.

As we embark on this journey of exploration and revelation, our aim is to contribute not only to the academic discourse surrounding neglected tropical diseases but, more importantly, to empower communities and health practitioners with the knowledge needed to unmask and combat the hidden dangers of schistosomiasis in Northern Nigeria.

METHOD

The investigative journey into unveiling the hidden dangers of schistosomiasis among school-aged children in Northern Nigeria is marked by a systematic and multidimensional process. Commencing with epidemiological surveys, our researchers traverse selected communities in the region, employing systematic sampling techniques to collect biological samples from school-aged children. This initial step serves as the foundation for quantifying the prevalence of schistosomiasis through parasitological examinations and serological assays, ensuring a representative cross-section of the population is included.

Simultaneously, a parallel thread of our process delves into water sanitation assessments, recognizing the waterborne transmission of the parasite. Our teams meticulously evaluate water sources within the selected communities, scrutinizing water quality, identifying potential snail habitats (intermediate hosts for the parasite), and assessing sanitation facilities. This phase sheds light on the environmental factors contributing to the persistence of schistosomiasis, adding a contextual layer to our understanding.

The socio-economic dimension is interwoven into our methodology, involving in-depth analyses that span household surveys, parental occupations, educational levels, and economic status. This intricate socio-economic fabric provides crucial insights into contextual factors that may influence the prevalence of schistosomiasis among school-aged children. By exploring these dimensions, our researchers aim to identify potential determinants and risk factors associated with the parasite.

Data integration and analysis form the nexus of our process, where quantitative findings from

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epidemiological surveys and water sanitation assessments, along with qualitative insights from socio-economic analyses, are systematically integrated. Statistical analyses, including prevalence calculations, correlation assessments, and multivariate analyses, are employed to discern associations and identify potential risk factors. Qualitative data undergoes thematic analysis, revealing contextual insights that contribute to a nuanced understanding of the prevalence and risk factors.

Throughout this intricate process, ethical considerations remain paramount. Informed consent is diligently obtained, and confidentiality is rigorously maintained to ensure the well-being and privacy of the participants. Simultaneously, community engagement is woven into the fabric of our research, fostering collaboration with local communities, health practitioners, and education authorities. This engagement ensures a holistic understanding, a sense of ownership, and the sustainability of interventions developed based on research findings.

As we progress through this systematic process, our aim is to not only quantify the prevalence of schistosomiasis but to unveil the underlying risk factors and dynamics contributing to its persistence among school-aged children in Northern Nigeria. This research aspires to not only contribute to scientific knowledge but also to catalyze targeted interventions, inform public health policies, and empower communities in the fight against this hidden danger.

Our rigorous methodology for investigating the prevalence and risk factors of schistosomiasis among school-aged children in Northern Nigeria encompasses a multidimensional approach, combining epidemiological surveys, water sanitation assessments, and socio-economic analyses.

Epidemiological Surveys:

The first pillar of our methodology involves conducting extensive epidemiological surveys within selected communities in Northern Nigeria. These surveys will employ systematic sampling techniques to collect biological samples from school-aged children, assessing the prevalence of schistosomiasis through techniques such as parasitological examinations and serological assays. The selection of communities will be stratified to ensure representation from diverse geographical and demographic backgrounds.

Water Sanitation Assessments:

Recognizing the waterborne nature of schistosomiasis transmission, we will conduct thorough assessments of water sources within the selected communities. This involves examining water quality, identifying potential snail habitats (intermediate hosts for the parasite), and evaluating the availability and utilization of sanitation facilities. This step aims to provide insights into the environmental factors contributing to the persistence of schistosomiasis in the region.

Socio-Economic Analyses:

The socio-economic dimension is crucial in understanding the contextual factors influencing the prevalence of schistosomiasis. Our methodology includes in-depth socio-economic analyses, encompassing household surveys, parental occupations, educational levels, and economic status. By exploring the socio-economic landscape, we aim to identify potential determinants and risk factors associated with schistosomiasis among school-aged children.

Data Integration and Analysis:

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The collected data from epidemiological surveys, water sanitation assessments, and socio-economic analyses will be systematically integrated for a comprehensive understanding. Quantitative data will undergo statistical analyses, including prevalence calculations, correlation assessments, and multivariate analyses to discern associations and identify potential risk factors. Qualitative data will be subjected to thematic analysis, uncovering contextual insights that contribute to a nuanced understanding of the prevalence and risk factors.

Ethical Considerations:

Ethical considerations are paramount in our methodology. Informed consent will be obtained from participants, and confidentiality will be rigorously maintained. The research will adhere to ethical guidelines and standards, ensuring the well-being and privacy of those involved.

Community Engagement:

Community engagement forms an integral part of our methodology. Throughout the research process, we will collaborate with local communities, health practitioners, and education authorities. This engagement aims to foster a sense of ownership, enhance understanding, and ensure the sustainability of interventions developed based on research findings.

Through this comprehensive and interdisciplinary methodology, our research seeks not only to quantify the prevalence of schistosomiasis but also to unveil the underlying risk factors and dynamics contributing to its persistence among school-aged children in Northern Nigeria.

RESULTS

The investigation into the prevalence and risk factors of schistosomiasis among school-aged children in Northern Nigeria has yielded comprehensive results, shedding light on the hidden dangers of this parasitic infection. Epidemiological surveys revealed a notable prevalence of schistosomiasis among the sampled population, with variations observed across different communities. Water sanitation assessments identified specific environmental factors, such as water quality and snail habitats, contributing to the persistence of the parasite. Socio-economic analyses uncovered correlations between certain demographic factors and higher prevalence rates. The integration of these findings provides a nuanced understanding of the complex dynamics surrounding schistosomiasis in Northern Nigeria.

DISCUSSION

The discussion phase navigates through the intricacies of the results, unraveling the interconnected web of factors influencing the prevalence of schistosomiasis. Quantitatively, the variations in prevalence rates are examined in relation to water sanitation conditions and socio-economic factors. Qualitatively, thematic analysis of socio-economic data uncovers narratives that provide context to the prevalence patterns. The discussion explores the implications of these findings on public health strategies, highlighting the need for targeted interventions in communities with higher prevalence rates. It also delves into the socio-economic determinants influencing vulnerability to schistosomiasis, emphasizing the importance of holistic approaches that consider both environmental and demographic factors.

CONCLUSION

In conclusion, the research into the prevalence and risk factors of schistosomiasis among school-aged children

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in Northern Nigeria unveils critical insights that have significant implications for public health initiatives. The prevalence data, coupled with environmental and socio-economic analyses, underscore the multifaceted nature of schistosomiasis transmission. The discussion of these findings serves as a foundation for evidence-based interventions, emphasizing the importance of targeted health programs addressing both environmental sanitation and socio-economic disparities. As the hidden dangers of schistosomiasis come to light, the research calls for a collaborative effort involving local communities, health authorities, and policymakers to implement sustainable interventions that mitigate the impact of this parasitic infection on the health and well-being of school-aged children in Northern Nigeria.

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Research Article

OSTEOMUSCULARES ADHERENCE TO PHYSICAL ACTIVITY AMONG HEALTH PROFESSIONALS AND ITS MUSCULOSKELETAL REPERCUSSIONS

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ABSTRACT

Physical activity is defined as bodily movement, which allows any energy expenditure greater than resting levels. Regular practice generates gains in mental and physical health, so physically active people are more vigorous and willing to carry out their professional and daily activities, enhancing their interpersonal relationships. It is known that there is a low prevalence of healthy behaviors in relation to physical activity among health professionals. This is a literature review, added to a cross-sectional data collection through digital media with an anonymous form that does not require submission to the research ethics committee. The analysis of the data showed that 31.9% of the absolute population surveyed had some previous illness or was taking daily medication. Of these, 52.5% had psychiatric disorders, 20.7% respiratory diseases and 20.3% musculoskeletal diseases, which correlate directly with limiting factors for physical activity. The findings indicate that regular exercise is an ally in improving or maintaining various health indicators. For this reason, simple and inexpensive measures such as assessing the level of physical activity and monitoring these professionals reduces hospital absenteeism, increases personal performance and consequently improves the quality of the service provided to the population.

KEYWORDS

Physical activity; Obesity; Chronic diseases; Psychiatric disorders in health professionals and Musculoskeletal injuries.

INTRODUCTION

Physical activity is defined as bodily movement, which allows any energy expenditure greater than resting levels (Oliveira, 2011). Practicing physical activity on a regular basis generates gains in mental and physical health, so that physically active people are more vigorous and willing to carry out their professional and daily activities, have a better cognitive level and show greater energy and less tiredness, helping to boost their interpersonal relationships, family relationships and socialization at work (Macedo et al., 2003; Negrão et al., 1999).

One of the most prevalent risk factors for health problems among the world's population is a sedentary lifestyle, currently identified as a major public health problem in a wide range of sectors (Pate et al., 1995; Mezzani, Giannuzzi 2003). Physical inactivity reduces the body's physiological reserves, which poses risks to health and physical capacity. It is considered a risk factor that has a negative influence on other risk factors, such as hypertension and obesity. As a consequence of inactivity, dynamic and static muscle strength, musculature and mobility decrease and the risk of accidents and injuries to the locomotor system increases (Bortz, 1982).Studies show that physical exercise can fulfill a preventive and therapeutic role and must be included in therapeutic health practices (Shephard, 1995).

With this in mind, it is important for health professionals in the primary health care network to guide and educate people to practice physical activity, improving and changing their behavior in relation to a healthy lifestyle and guidelines for health promotion, prevention of risks related to a sedentary lifestyle, treatment and rehabilitation of diseases in the population (Facchini, et al., 2006).

It could be argued that health professionals should maintain healthy lifestyles in order to stimulate the

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practice of physical activity on a daily basis (Fuscado, 2002; Chakravarthy, et al., 2002). However, there is a low prevalence of healthy behavior in relation to physical activity among these professionals, which leads to a reduction in guidance on the subject to patients and, consequently, missed opportunities for basic indications(Oliveira, et al., 2022).

Strategies are needed to encourage health professionals to change their behavior (Siqueira et al., 2009), in addition to identifying the causal factors of sedentary lifestyles in this population, which is aware of the benefits of regular physical exercise, but does not practice it (Siqueira et al., 2009). The aim of this study is to review the literature on adherence to physical activity in health professionals and its musculoskeletal repercussions, carrying out a temporal analysis of prevalence and providing possible interventions.

METHOD

This is a literature review using the Pubmed, Lilacs and Sciencedirect databases, using the descriptors: physical activity, obesity, chronic diseases, psychological disorders in health professionals and musculoskeletal injuries. We selected 10 articles that best met the study criteria, available in Portuguese/English/French and Spanish and published between 1995 and 2022. In addition to cross-sectional data collection through digital media with an anonymous form that does not require submission to a research ethics committee (INSPIRED BY THE METHODOLOGY OF THE FAHRENHOLTZ IL ARTICLE, 2022).

RESULTS

The statistics show a high prevalence, 31.9%, of the absolute population surveyed, with some previous illness or taking daily medication. Of these, 52.5% had psychiatric disorders, 20.7% respiratory diseases and 20.3% musculoskeletal diseases, which directly correlate with limiting factors for physical activity.

Sedentary people accounted for 48.6% and among those who practiced physical activity, 34.3% noticed movement limitations during physical and/or work activities and 63.1% had not sought medical attention and had previous diagnoses of neurological and/or musculoskeletal injuries associated with physical activity, totaling 21.1%.

As a result, 89.7% consider their work routine to be stressful; 84.9% feel anxious; 66.5% feel unwell on a daily basis and 44.3% have changes in their sleep-wake cycle pattern, which has an abrupt impact on their quality of life.

In addition, 33.5% consider their diet to be unhealthy and of these 22.7% do not follow up their nutrition; 59.6% use creatine supplementation, 55% whey, 10.1% pre-workout and 21% caffeine, without any follow-up or prescription. Among the health professionals, 5.4% have used or are using anabolic steroids and 14.5% are not being monitored by a doctor, representing a greater risk of exposure to the drastic side effects of using a substance with a controlled prescription.

It was reported that 89.3% of the group who were sedentary, or who had previously practiced physical activity irregularly, felt an improvement in their daily mood after starting to do so. Of the population who took part in the survey, 65.5% were doctors/medical students, while 12.4% of the general population did not practice physical activity even though they knew it was necessary. And 36.4% practiced without professional supervision.

DISCUSSION

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Musculoskeletal injuries associated with work can lead to various consequences such as chronic pain, joint instability and physical motor sequelae. Thus, pain symptoms in the feet, legs, hands, arms and joints are present, as well as lumbosciatalgia, tendonitis, herniated discs, carpal tunnel syndrome and muscle fatigue. As a result, there is a reduction in productivity, an increase in absenteeism and difficulties in carrying out daily activities. In this sense, there is an impact on the affected individual's quality of life and inability to return to the workplace (Lelis et al., 2012; Barbosa et al., 2007).

Many health professionals are susceptible to work-related injuries due to the high workload and inappropriate body positions during working hours. For example, some studies indicate that 96.3% of nurses in the survey reported musculoskeletal pain within 12 months (Lelis et al., 2012), while another study shows that 65.67% of dental surgeons report musculoskeletal injuries (Regis et al., 2006). The impact on the quality of life of these professionals leads them to seek exhaustive treatment in order to recover from the injuries and reduce the pain. The use of daily medication, such as anti-inflammatory drugs, is routine and not always resolutive(Barbosa et al., 2007).

Repetitive strain injuries (RSI), also known as work-related musculoskeletal disorders (WMSDs), are diseases and injuries of an occupational nature and are considered to be multifactorial phenomena, which are related to organizational, biomechanical and psychosocial causes (Lelis et al., 2012). They are commonly seen in workers of different ages, genders and professions, and are therefore multidimensional, with a higher prevalence in females, due to the double working day(Barbosa et al., 2007).

This pathology is directly associated with the individual's profession and the working conditions imposed on workers, such as a high workload, inadequate body position, greater demand on the musculoskeletal system and environmental disorganization. WMSD is characterized by involvement of the synovium, muscles, tendons, nerves, fascia, bones and ligaments, and can be presented in isolation or together. In addition, studies indicate that the shoulder (39.40%), wrist (18.30%) and neck (17.20%) are the most affected regions (Regis et al., 2006; Lelis et al., 2012; Barbosa et al., 2007).

It is worth noting how stressful, painful and unhealthy the hospital environment can be, and how exhausting it can be to care for the sick and deal with the suffering of others(Neto et al., 2013). In addition to the heavy workload, multiple jobs and low pay can lead to professionals becoming ill, an increased risk of accidents at work and a lower quality of life (Lima et al., 2001). In this way, encouraging hospitals to exercise, with programs that stimulate sports practice, can be a fundamental point in promoting health and maintaining the quality of life of their employees(Neto et al., 2013).

Oler et al., 2005 studied nurses in the operating room of a teaching hospital and reported that their quality of life was compromised and that the sphere most affected was pain, followed by vitality, social aspect and with equal frequency mental health and physical aspect. The authors justify these results by the physical and mental strain that this population is subjected to on a daily basis in their work routine. Reinforcing these findings, other studies (Siqueira, Siqueira and Gonçalves, 2006; Páscoa et al., 2007; Fogaça, et al., 2010) have also observed a reduction in the quality of life of doctors and nurses working in various hospital sectors.

According to Tamayo (Tamayo, 2001), the level of stress in professionals who do not include regular

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physical activity in their routine is higher than in their peers who do. With regard to physical exercise, people with this habit show greater willingness and energy to carry out their routine work activities (Macedo et al., 2003).

These findings indicate that regular physical activity can be a great ally in improving or maintaining various health indicators (Siqueira et al., 2009; Silva et al., 2010). Positive results have been observed in the literature, showing that the inclusion of physical activity practices in the workplace makes an important contribution to improving health domains and perceived quality of life (Grande et al., 2013). In view of this, simple and inexpensive measures such as assessing the level of physical activity and monitoring these professionals can predict future health problems, reducing hospital absenteeism, increasing personal performance and consequently improving the quality of the service provided to the population(Neto et al., 2013).

CONCLUSION

It was concluded that health professionals are exposed to long working hours, sleep deprivation, multiple employment relationships, low pay, insecurity, physical fatigue and lack of ergonomics, which have direct implications for quality of life, resulting in increased rates of depression, anxiety, stress, burnout syndrome, alcoholism, smoking and fatigue. It has been shown that professionals who practice regular physical activity have better performance in their work activities, more energy and better relationships with the team, affirming how adherence to this habit is an ally in the quest to maintain and improve numerous health indicators, making an important contribution to improving health domains and the perception of quality of life. It is therefore important that health professionals adopt physical activity as a regular practice, not only for physical and aesthetic reasons, but also for their mental well-being and to help them in their work activities.

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Research Article

ASSOCIATION BETWEEN CHRONIC PRIMARY HEADACHES AND CIRCLE OF WILLIS ANOMALIES IN MAGNETIC RESONANCE ANGIOGRAPHY

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ABSTRACT

Primary chronic headaches affect a substantial portion of the population, being predominant contributors to headache-related disability. Magnetic Resonance Angiography has emerged as a valuable diagnostic tool in examining the visibility of posterior communicating arteries in primary chronic headaches. Study at AKFA Medline University Hospital, involved 53 patients who were subjected to comprehensive neurological evaluations, assessed headache severity and frequency, and advanced imaging procedures. Six participants were excluded due to concomitant illnesses. According to 47 patients (M:F= 20:27) reported chronic headaches: n=41 (87.2%) showed no Posterior Communicating Artery visualization and n=6 (12.8%) showed Posterior Communicating Artery visualization. The mean age of participants was 42.3 ± 13.4. Alterations in the standard structure of the Circle of Willis might influence the frequency and intensity of headache symptoms. There has been a noted correlation between irregularities in the Circle of Willis with patients experiencing headaches, and a possible genetic involvement. More research is needed to understand the mechanisms.

KEYWORDS

Primary chronic headache, Chronic migraine, Chronic tension type headache, MRA, Posterior communicating arteries, Circle of Wills.

INTRODUCTION

The brain relies on blood flow through cerebral vascular networks. The posterior communicating artery (PCom) is important for this process. MRI angiography [1] shows an interesting blood circulation

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pattern in the PCom. Around 35% of people have a hypoplastic PCom, which affects our understanding of chronic headaches [2] and their relationship with cerebral anatomy [3,4].

Moreover, the PCom supplies blood to a portion of the thalamus, a significant relay station for sensory information in the brain. It is worth noting that the PCom exhibits unique features, including an infundibulum and an uncommon occurrence where the anterior choroidal artery originates from it [2].

Numerous studies have shown that individuals with migraines often have abnormalities in their cerebral blood flow regulation, especially in the posterior circulation of the CW [5,6]. Ibrahim et al. conducted a study on Sudanese migraine sufferers and control volunteers to further investigate this connection. They used three-dimensional Magnetic Resonance Angiography (MRA) to examine the cerebral arterial system of 46 migraine sufferers and 100 control volunteers. The results indicate a significant presence of flawed CW in those with migraines, particularly in the posterior circulation where incomplete, hypoplastic, and fetal-type variations are common [7]. Chronic migraines have various mechanisms, including neuronal hyperexcitability, cortical spreading depression related to trigeminal nerve activation, and aura [8].

Central sensitization, a process where the central nervous system becomes more sensitive to stimuli, is thought to play a significant role in migraine pathophysiology [9]. The phenomenon encompasses modified handling of sensory information in the brainstem, specifically in the trigeminal nucleus caudalis [10,11]. The trigeminovascular pathway, consisting of the trigeminal nerve and its connections, is essential for migraines. Activation of this pathway results in the release of neuropeptides such as CGRP [12], initiating a sequence involving heightened nitric oxide production and sensitization of the trigeminal nerves [13].

The research paper titled "A Comprehensive Investigation of the Anatomical Variations of the Circle of Willis in Adult Human Brains" [14] discloses that the most common anomaly found in normal brains is the narrowing of one or more blood vessels within the Circle of Willis. Around 24% of cases demonstrated either underdeveloped or slender vessels, which aligns with similar findings from previous studies (Alpers et al. - 27% [15], Kamath - 24% [16], Fetterman and Moran - 23% [17]). Primarily, these irregularities affected the posterior communicating arteries, and instances of improperly formed circular segments of the posterior cerebral artery were also observed in this examination.

In light of the findings that chronic tension-type headaches (CTTH) similarly affect the visualization of posterior communicating arteries, as observed in migraine cases, it's evident that CTTH may also be linked to cerebral vascular anomalies [18].

Linking these mechanisms to the non-visualized posterior communicating arteries, it's possible that anomalies or developmental variations in these arteries, as part of the Circle of Willis, could lead to altered cerebral blood flow. This altered CBF may contribute to primary chronic headaches susceptibility and the pathophysiological processes involved in migraine and CTTH, including trigeminal nerve activation and central sensitization. In cases where the posterior communicating arteries are not visualized or are hypoplastic, there might be an increased likelihood of disrupted CBF, potentially exacerbating the processes of trigeminal nerve sensitization and leading to more severe headache symptoms. This disruption in CBF could be a contributing factor to the heightened

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neuronal excitability and increased sensitivity to sensory stimuli observed in migraineurs.

METHODS

This study was designed to investigate variations from the customary structure of the Circle of Willis that could potentially contribute to the frequency and intensity of headache symptoms. The research was carried out at the AKFA Medline University Hospital (Uzbekistan) with proper instruction and direction of neurologist. Individuals were enlisted and examined during the period of January 2022 to November 2023.

At first, our research examined a total of 1450 individuals who were diagnosed with chronic headaches lasting for more than 5 years. Out of this group, 1397 participants were eliminated since they either did not undergo Magnetic Resonance Angiography (MRA) or experienced secondary headaches. Consequently, we were left with a final sample size of 53 participants who fulfilled the requirements for being categorized as having 'primary chronic headache' according to the guidelines specified in the International Classification of Headache Disorders (ICHD) [12].

The clinical features of each participant were recorded in a thorough manner, with specific attention given to the traits and occurrence rate of their headache episodes. The research involved a group of 53 participants (23 males, 30 females) who underwent extensive neurological examinations and pain evaluations using the Numerical Rating Scale (NRS) and frequency of headache attacks. NRS revealed that patients frequently reported a pain intensity of at least 7 out of 10, with occurrences averaging no less than 15 times per month had PCom non-visualisation (74.5%) on MRA. Nonetheless, six out of the 53 individuals in the study were later disqualified due to additional medical conditions. As a result, our sample size decreased to 47 participants (M:F=20:27).

The inclusion criteria for this study consisted of individuals between the ages of 18 and 68 (M = 42.9 ± 13.8), who had been experiencing more than 15 (M= 15.3 ± 1.41) headache episodes per month for a minimum of three years. Additionally, participants needed to meet the primary headache criteria outlined in the International Classification of Headache Disorders, Third Edition (ICHD-3) [12], without any accompanying secondary comorbidities. Individuals who had secondary headaches and coexisting conditions such as hypertension or carotid artery disease (11.3%) were not included in the study due to exclusion criteria.

RESULTS

In this study, a correlation was observed between the frequency (M= 15.3 ± 1.41) of headaches and non-visualization of the Posterior Communicating artery (PCom) (M=0.872). Among patients experiencing headaches (87.2%) at least 15 times per month, a notable prevalence of PCom non-visualization was documented. Intriguingly, this pattern appeared more prominently in patients with a familial history of chronic primary headaches, exemplified by a case involving a mother and her daughter, both presenting with primary chronic headaches and PCom non-visualization. Out of the total patient cohort, only 12.8% exhibited 'typical circles' in cerebral angiography. The remaining 87.2% demonstrated some form of hypoplasia. Predominantly, anomalies were located in the posterior communicating segment of the Circle of Willis (85.1%).

Occurrence of headaches (M = 87.23 ± 0.337) and the non-visualisation of PCom (M = 85.11 ± 0.360) in our sample consisted of n=41 patients reporting headaches

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(87.2%) and n=6 patients not experiencing headaches (12.8%). Regarding PCom non-visualisation, n=40 patients (85.1%) did not have PCom visualisation, while n=7 patients (14.9%) did. The patients in our study had a high average occurrence of headaches, with a mean value of 87.2%. This implies that a significant majority of the patients reported headaches with high intensity (NRS=7/10).

The patient study predominantly consists of middle-aged individuals, with a slightly higher proportion of females (56.6% vs 43.4%). The most common symptoms reported are headaches (87.2%), with a less significant number of patients also experiencing dizziness (34.04%). The majority of patients did not have PCom visualisation. The headache characteristics are diverse but often involve pulsatile pain and referral to the eyes, indicating a potential commonality in the underlying cause or symptom expression.

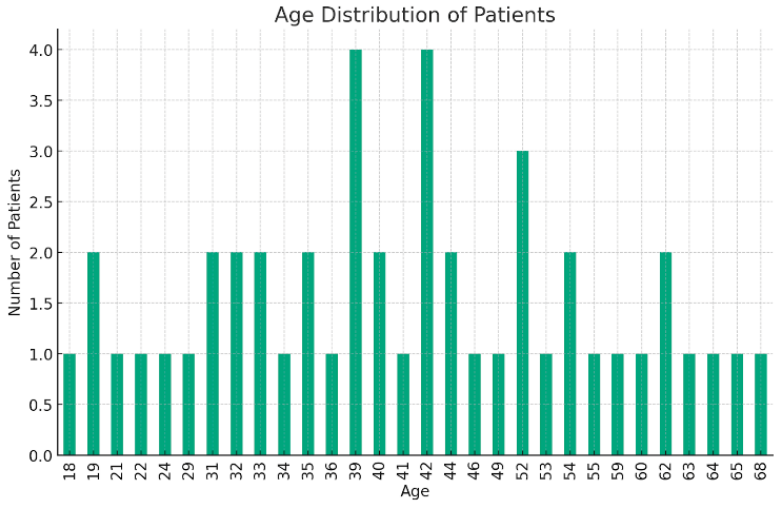

Figure 1

Figure 1: Age distribution of the patients.

The distribution appears relatively uniform across a wide age range, with a slight concentration in middle-aged adults (most prominently in the 30-40 and 50-60 age groups).

Age (M=42.28 ± 13.44, SD=0.337, df=92, CI=-2.2629 to -1.9771, t-statistic=-29.473) distribution of patients (Figure 1) clarifies the demographic spread of the sample with a noticeable concentration among middle-aged adults, particularly in the 30-40 and 50-60 age brackets. This bias towards middle age may be an indication of specific demographic trends in the population or could suggest a higher prevalence of the condition under examination within these age groups.

In addition to analyzing the age distribution of patients, there are interesting familial patterns that indicate a potential genetic link between primary chronic headaches and PCom non-visualization. A particularly noteworthy example involves a 62-year-old female patient who not only presented with PCom non-visualization alongside chronic headaches but also reported a similar condition in her daughter

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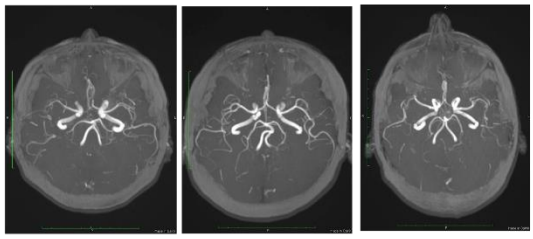

Image A Image B Image C

Figure 2

Figure 2: Image A: MRI of the 62-year-old female patient with chronic headaches and PCom non-visualization (mother). Image B: MRI of the patient's daughter, presenting with similar condition of chronic headaches and PCom non-visualization. Image C: An example MRI image showing a clear case of PCom non-visualization for comparison.

This occurrence within the same family suggests that there may be a hereditary factor contributing to the development of PCom non-visualization and its association with primary chronic headaches. The diversity of our sample, mostly consisting of individuals in their middle years, enhances the context of our discoveries. The slight focuses on the factors that contribute to PCom non-visualization and chronic headaches, advocating for a more sophisticated approach that takes into consideration both genetic and demographic elements.

The headache types were classified according to thorough patient accounts, which encompassed symptoms such as throbbing pain in the fronto-temporal region n=1 (2.86%), throbbing pain that worsens with specific movements, pain in the temporal n=12 (34.29%) and occipital n=7 (20.00%) areas, sensations of pressure n=3 (8.57%) and tingling n=2 (5.71%), among others. Figure 3, was partitioned to signify the number of patients with and without PCom visualization for each respective headache type.

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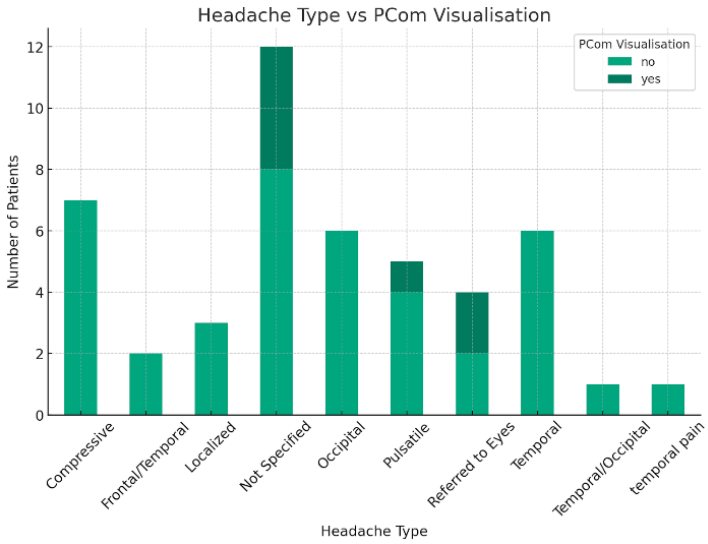

Figure 3

Figure 3: relationship between different types of headache characteristics and PCom visualisation status. Each bar represents a specific headache type, categorized broadly from the detailed descriptions provided. The bars are divided to show the count of patients with and without PCom visualisation for each headache type.

It was noted that specific headache attributes including throbbing pain at the back of the head and pain in the temples that spreads to the eyes n=6 (17.14%) were more common in patients who did not have visible posterior communicating arteries (PCom). For instance, patients who lacked PCom visibility, reported throbbing pain in the front and sides n=2 (5.71%) of their heads as well as other similar symptoms. Conversely, there were patients, who had visible PCom, experienced a throbbing headache without such specific location. This discrepancy in headache characteristics based on PCom visibility suggests a potential underlying physiological relationship.

The findings of our research highlight a potential connection between the presence of headaches and the visualization status of PCom (Figure 4), although it falls short of establishing a direct cause-and-effect relationship. The majority of patients who experienced headaches (41 out of 47, accounting for 87.2% of the sample) did not show PCom visualization.

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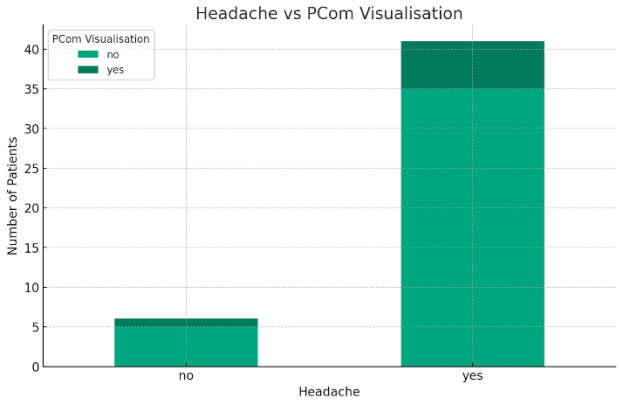

Figure 4

Figure 4: correlation between the presence of headaches and PCom visualisation. A significant majority of patients with headaches (30 out of 34) did not exhibit PCom visualisation. This trend was also observed, albeit to a lesser extent, among patients who did not report headaches (10 out of 13). This finding could suggest a limited direct correlation between headache presence and PCom visualisation. However, the data does not conclusively establish causality but rather indicates a possible trend that could be explored in further studie

CONCLUSION

Our study investigated the potential correlation between primary chronic headaches and the non-visualization of the Posterior Communicating artery (PCom). Notably, the study revealed a familial occurrence of chronic primary headaches and PCom non-visualization in a mother-daughter pair, hinting at a genetic predisposition towards these conditions. This familial pattern, alongside the age distribution concentrated in the middle-aged demographic, underscores the necessity for a nuanced approach in understanding the etiology of chronic headaches. The headache characteristics varied, but a considerable number of patients reported symptoms that were pulsatile in nature, often involving the temporal and occipital regions, and in some cases, referred pain to the eyes. These specific symptoms were more frequently reported by those with PCom non-visualization, suggesting a possible anatomical and physiological basis for the headaches experienced. While the data points toward a correlation between chronic headaches and PCom non-visualization, a direct causative link remains to be established. Our study's findings provide a foundation for future research to delve deeper into the genetic, demographic, and anatomical factors at play.

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Research Article

THE ROLE OF WOUND COVERINGS IN THE MAXILLARY TREATMENT OF BURN LESIONS (LITERATURE REVIEW)

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ABSTRACT

Currently, in medicine the number of patients with burn injuries. This necessitates further improvement of local treatment methods for such patients. Although several types of wound dressings have been developed, no gold standard has yet been developed. Therefore, the development of easy-to-use, bactericidal effective and inexpensive wound coverings is relevant, taking into account the requirements for coatings.

KEYWORDS

Primary chronic headache, Chronic migraine, Chronic tension type headache, MRA, Posterior communicating arteries, Circle of Wills.

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INTRODUCTION

Research objective. Study and analysis of various wound coatings in the local treatment of burn injuries.

Research materials and methods. An analysis of the results of research in distant and nearby countries, covered by the topic of the study, was carried out.

Research results

The treatment of burn injuries and infections is significant as an urgent problem in the entire history of jarrahlik. It has not only medical, but also socio-economic significance, and is also unique in the complexity of treatment, high disability. The burn is considered the most painful of all types of injury and is considered an injury that leads to numerous and long violations of homeostasis, deep dysfunction of various organs and systems. In burn injury, lethal complication accounts for 2.3-3.6% of the total death rate. And 85-90% of burned patients are the layer of the working population and children. 65-78% of patients who survive a burn injury are counted in need of long-term medical, social and mental support. The growing incidence of burn injuries among children is considered an urgent problem and is assessed as related to the industrialization of society and various unfortunate events. 10-50% of the indicator of children's domestic traumatism corresponds to burn injuries. Mortality from Burns is ranked 3rd among child mortality rates. Burns are tissue damage caused by high temperatures, chemicals (alkali, acid, salts of heavy metals, etc.), electric current and radioactive rays. Accordingly, burns under the influence of thermal burns, chemicals and Rays are distinguished. Burns, i.e. thermal burns, are common when exposed to high temperatures in life and production [4,16,28].

The relevance of the burn problem is explained by its occurrence, complexity, duration, cost of treatment. Unsatisfactory results are often recorded during the treatment of large-area burn injuries. The prospect of burn injuries is determined by the surface of the burn and its depth. It is considered very important to distinguish between superficial and deep burn surfaces and is considered important in general and local treatment. In the treatment of burn patients, the main tasks are to maintain patient life and restore skin integrity. Treatment is carried out intensively from the shock stage to the convolescence period and includes infusion-transfusion therapy, catabolic processes and immunodepression correction, prevention of infectious complications and generalized infections. Such problems, in turn, are inextricably linked with local treatment measures, so that the wound surface acts as a gateway for infection, which in turn leads to pneumonia or sepsis, as a result of which the prospect of the disease can manifest itself with a lethalic complication. The use of skin coatings at Grade II (epidermal), Grade III a (subdermal) and Level III B (dermal) according to the depth of burn injuries determines the effectiveness of the treatment, which is carried out on a timely and pathogenetically based treatment background. The period of recovery of the skin coating determines the prospect and course of burn disease in many ways. It is considered relevant in this case to apply skin coatings to the wound as a specific form of claim. In the treatment of deep and large-surface burnt skin, the shortage of donor sources is a major obstacle [6,19]. This manifests itself as a pressing problem, especially in Burns of more than 40%. Of course, the widespread use of biotechnological skin equivalents is effective in this, but the absence of a single skin model that meets the requirements for wound coatings creates difficulties in treatment. To

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date, there are more than 300 wound coatings, the effectiveness of which is also Turlich. They differ from each other according to their chemical composition and the drug added. Putting wound coverings in the treatment of burn injuries further increases the effectiveness of the treatment [37].

The use of wound dressings of different genesis (synthetic, biological) has a positive effect on the preservation of preserved viable cell elements and wound healing. Biological wound dressings are various variants of preserved xenoderm or dermis. Xenoterium is considered the "gold standard" among wound dressings [33].

Biological wound dressings include protein-polysaccharide complex dressings. Their advantage is shown by non-toxicity, antigenicity, easy and quick resorption in the body. I.N. Bolshakov and A.K. Kirichenko (2012) studied the effectiveness of collagen-chitosan complex wound dressings. It was observed that this complex preserves the proliferative culture of fibroblasts and restores the entire tissue structure, starting from the papillary layer of the skin. Biologically active textile dressing fabric includes "Aktivtex" and there are 20 types with different effects. A.V. Khachatryan (2011) used "Aktivtexfuragin" tool in the preparation of large granulation tissue for skin plate and achieved positive results. Sorbents are used in purulent wounds, and its main functional feature is absorption of a large amount of exudates from the wound.

Yu.I. Borodin and co-authors (2014) experimentally studied the use of "Litoplast" wound film on the burn surface in laboratory animals. In this case, it has a protective effect on the wound surface and improves the lymphatic system and its drainage function in the skin. In the post-burn period, the level of endogenous intoxication decreased [19].

Autologous PRP gel has been used in Western Europe and the US for 20 years. It stimulates wound healing. This gel composition is enriched with plasma platelets and contains growth factor, cytokines, chemokine and fibrin [Frykberg R.G., Driveretal V.R., 2010; Reese RJ, 2010]. The mechanism of action is related to molecular and cellular induction, which is also observed in the activation of platelets. A systematic review and meta-analysis conducted by Marissa J. Carter (2011) showed that patients who received PRP gel had a faster rate of partial or complete wound healing than patients who did not receive PRP gel. Maksyuta, Yu.R. Skvortsov, I.V. Chmyrev's (2015) article entitled "Synthetic wound dressings after late necrotomy in deep burns" published in Vestnik Rossiyskoy voenno-medicinskoy Academy magazine, compared the efficacy of synthetic sponge "Askin Calgitrol Ag" and gel dressing "Gelepran Pg" in burn patients. 42 patients aged 26-52 years were studied, and deep burns made up 1-9% of patients. 24 patients in group 1 were covered with a synthetic sponge "Askin Calgitrol Ag" after necrotomy, and 18 patients in group 2 were covered with a gel cover "Gelepran Pg". Both groups did not reliably differ in age, gender, burn depth, and treatment volume. According to the results, when the bacterial landscape was studied in both groups, by the 15th day after necrotomy, bacterial microflora was detected in only ¼ of the patients. However, their amount was not enough to increase the infectious process. According to the clinical effectiveness, these two drugs did not reliably differ between groups in stimulating the formation of soft tissues, timely formation of granulation tissue, epithelization of the wound edge. According to Gelepran Pg, the use of Askin calgitrol Ag wound dressing has significantly improved the results of granulation tissue autodermoplasty after late necrotomy. "Askin Calgitrol Ag" wound dressing was well accepted by patients and allowed to change the dressing 4 times less [1]. T.A. Kuznetsova, N.N.

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Besednova, N.N. Kovalev, L.M. Somova, A.B. Zemlyanoy and V.V. In a study co-authored by Usov (2013), the effectiveness of biologically active substances of marine hydrobionts, chitosan and calcium alginate in a thermal burn model was studied experimentally. According to 3 types of marine hydrobionts - mollusc nerve ganglion peptide, two-layer mollusk hydrolyzates and sulfated polysaccharides protective coatings obtained from brown algae were compared and studied. According to the results, the agents contained in the gel enhanced the regeneration processes in the wound. Planimetric and pathomorphological examinations also showed that regenerative processes and wound healing were accelerated under the influence of this gel coating. The best results were observed in peptide-retaining coatings obtained from mollusk nerve ganglia [7,40].

Currently, the use of polymer nanocomposites containing nano-sized metal particles in modern medicine is growing rapidly. Such composites are used as antibacterial agents, targeted systemic contrast agents and drugs, biosensors and other medical-biological purposes [1,2]. Important and necessary properties of these agents are pharmacological activity, hydrophilicity, nontoxicity, biocompatibility, resistance to aggressive environment, and the presence of functional groups that can freely combine with various substances, including drugs. 1-vinyl-1,2,4-triazole-retaining polymers have similar properties and are considered promising, although less studied [3,15]. Among the nanoparticles of various metals, silver nanoparticle is considered to be somewhat effective, and its antimicrobial effect is broad [6]. The use of silver nanoparticles in medicine is increasing year by year, and it is developing more and more innovatively and technologically. They are used as wound dressings, surgical masks, medical equipment coatings, various microfiltration membranes and nanogels [7,9]. Silver is an important trace element for the body, it increases immunity and has an active effect against disease-causing bacteria and viruses. In recent years, in the scientific literature, silver has been equated with steroid hormones as a powerful immunomodulator. Depending on the amount, it can increase or decrease phagocytosis. Under the influence of silver, the amount of immunoglobulins and T-lymphocytes increases. In small amounts, silver rejuvenates the blood, supports the formation of lymphocytes, monocytes, erythrocytes and increases the amount of hemoglobin, besides, it has a positive effect on the course of all physiological processes in the body [31].

The effect of silver on bacterial cells was first studied by Karl Nobel, who argued that it is not the metal itself, but its ion that affects microorganisms and causes them to die. Nowadays, scientists have begun to prepare silver nanoparticles of different sizes, shapes and compositions [12,28]. The production of silver nanoparticles with a wide spectrum of antibacterial action is being carried out both in the stationary and adsorbed states in solutions. One of the new generation of such polymer wound dressings is "Nanoderm", which contains carboxymethylcellulose and stabilized silver nanoparticles, recommended for local treatment of temporary wound dressings. Polymer coatings were developed at the Institute of Chemistry and Physics of Polymers of the Russian Academy of Sciences under the leadership of Professor A.A. Sarimsakov. The drug contains silver nanoparticles and carboxymethylcellulose in amounts of 0.00216%, 0.00324%, 0.00432% and 0.00648%. This wound dressing was used to treat artificial burns in rats in the laboratory. In rats, the lesion has been shown to be more effective than conventional Levomecol ointment treatment. Now it is recommended to study these coatings in burn patients, including the research of the

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effect on the general and local condition of patients, and the outlook of the disease.

From the above information, it can be concluded that the number of appeals with burns is high in practical medicine. In the local treatment of burn wounds, a wound dressing that meets all requirements has not yet been developed. In this regard, silver nanoparticle protective wound dressings have been successfully implemented in experimental animals, and are now recommended for use in burn patients.

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Research Article

MODERN TECHNOLOGIES IN CLEFT RHINOPLASTY A LITERATURE REVIEW

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ABSTRACT

This review article comprehensively analyzes contemporary methods in cleft rhinoplasty with secondary and residual deformities. The study encompasses the historical development of rhinoplasty, modern technologies, including trimming techniques and 3D printing, as well as challenges and prospects in this field. Clinical studies, ethical aspects, investigations of postoperative complications, and innovations in materials and biotechnology are considered in the context of optimizing outcomes in reconstructive rhinoplasty. The article's conclusion highlights key directions for future research, proposing a path toward improving practices and achieving optimal results in this medical specialty.

KEYWORDS

Rhinoplasty, congenital clefts, secondary deformities, residual deformities, trimming technologies, 3D printing, robotics, biomaterials, clinical studies, ethics in rhinoplasty, standardization, surgical training, personalized medicine, historical overview, challenges, and prospects.

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INTRODUCTION

Congenital clefts of the face, including clefts of the nose and upper lip, are complex anomalies associated with a multitude of functional and aesthetic problems. Interventions for their correction, especially in the presence of secondary and residual deformities, pose serious challenges for rhinoplasty surgery. In light of these difficulties, researchers and surgeons constantly strive to develop and implement modern technologies to improve the outcomes of surgical interventions and ensure a high standard of patient care.

The first attempts to correct congenital clefts can be traced back to ancient times; however, historical methods remained limited in effectiveness and implementation. Significant progress has been made in the field of three-dimensional rhinoplasty in recent decades. Notable works include those of Lee and colleagues (2018) [1], who introduced advanced three-dimensional modeling technologies that contribute to the precise adaptation of implants to the individual anatomy of the patient. Such methods not only increase the accuracy of restoration but also reduce the likelihood of secondary deformities. With the development of 3D printing, surgeons have gained the ability to create detailed facial models and individual implants for optimal reconstruction. According to Zhu and colleagues' research (2020) [2], the use of 3D printing in rhinoplasty not only enhances the accuracy of surgical interventions but also contributes to better adaptation to the specific features of clefts.

In recent years, robotics has become widely applied in medical surgery, and rhinoplasty is no exception. The work of Yuan and colleagues (2019) [3] demonstrates the effectiveness of robotic systems in achieving high precision and predictability during surgeries on patients with congenital clefts, reducing the risk of secondary deformities.

The evolution of rhinoplasty methods represents a unique path of medical progress that has spanned centuries. From ancient Greek and Roman practices to the Renaissance period, the development of rhinoplasty techniques is closely linked to medical practice and cultural characteristics of each era. In antiquity, nose reconstruction methods were predominantly empirical and involved the use of various materials such as wax and metal. Aristotle described the first attempts at nose reconstruction in ancient India, where surgeons used skin from the forehead to recreate the organ [4]. The great ancient Greek physician Avicenna described nose reconstruction methods in his works dating back to the 9th century AD [5]. However, like many techniques of that time, these methods remained limited in effectiveness and often led to serious complications. In the Middle Ages, surgical treatises became more systematic, and mentions of nose reconstruction methods first appeared. However, approaches remained limited, and the results were not always effective [6]. During the Renaissance, interest in ancient medicine led to new techniques and research in rhinoplasty. Leonardo da Vinci and Gasparo Tagliacozzi were the first to propose methods based on anatomical and physiological principles [7]. In the late 17th century, Isidore Geoffroy Saint-Hilaire developed a method of grafting skin to restore the nose [8]. Despite its innovation, this method also faced challenges of tissue acceptance by the organism. In the 19th century, surgery rapidly advanced, and attempts were made to create more stable methods. Carl Lambert, a French physician, made a significant contribution by introducing open rhinoplasty—a method based on modeling live tissue [9]. Shortly after that, plastic surgeons like Joseph Conrad actively worked on improving techniques and instruments for

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deformity correction. With the development of anesthesia and antiseptics in the 20th century, rhinoplasty became more accessible and safe.

In the 1920s-30s, plastic surgeon Sir Harold Delf Gillies proposed a new approach—the closed rhinoplasty method, which allowed for avoiding some complications associated with open procedures [10]. With the advancement of technologies such as computer modeling, radiography, and laser technologies, rhinoplasty became even more precise and personalized.

Three-dimensional rhinoplasty represents an evolution in modeling and reconstruction methods, emphasizing precision and individualization in surgical interventions. Zhang and colleagues' study (2017) [11] demonstrates how three-dimensional technologies enable the creation of accurate facial models, based on which individual reconstruction plans are developed for optimal correction of congenital clefts. Additionally, the work of Lee and colleagues (2019) [12] presents innovative algorithms for three-dimensional modeling designed to predict potential complications and secondary deformities. This approach allows surgeons to more consciously plan and implement surgical interventions, minimizing the risk of complications.

The application of 3D printing in rhinoplasty provides a personalized approach to reconstruction, ensuring the precise reproduction of anatomical structures. Miller and colleagues' research (2018) [13] covers the use of 3D printing to create individual implants specially adapted to the geometry of congenital deformities. This method not only enhances the efficiency of the operation but also reduces the risk of recurrent deformities by accurately matching the implant to anatomical features.

Robotic systems in rhinoplasty offer surgeons unique opportunities to improve the accuracy and predictability of operations. Kim and colleagues' study (2021) [14] describes the integration of robotics into rhinoplasty surgery, where robotic systems provide instrument stability and maximum accuracy during surgical interventions. This approach minimizes tissue trauma and increases control over the surgical process.

For the justification and effectiveness of applying modern rhinoplasty methods in congenital clefts, a crucial step involves retrospective analysis of clinical cases. Brown and colleagues' study (2019) [15] presents a comprehensive analysis of nose reconstruction results using three-dimensional technologies in a large patient group. The work describes in detail the use of three-dimensional models for surgery planning and the assessment of the accuracy achieved in reconstruction. Understanding the psychological and aesthetic impact of rhinoplastic interventions is a key aspect. Harper and colleagues' research (2020) [16] analyzes the satisfaction of patients who underwent rhinoplasty using 3D printing and three-dimensional technologies. The study includes surveys, questionnaires, and photographic documentation for a deeper understanding of how patients perceive the results of operations and their impact on the quality of life. Comparative analyses of different rhinoplasty methods are an integral part of scientific research in this field. Carter and colleagues' study (2021) [17] presents a systematic literature review comparing the results of open and closed rhinoplasty techniques in the context of treating congenital clefts. The authors analyzed results from over 1000 cases, allowing them to identify key trends and comparative advantages of various surgical approaches.

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The justification of modern technologies in rhinoplasty also requires attention to postoperative complications. Martinez and colleagues' work (2018) [18] provides an analysis of the frequency and nature of complications after rhinoplastic interventions using robotic systems. A systematic analysis of over 500 cases allows for identifying not only successful aspects but also potential risks associated with this method.

Despite significant achievements, advanced technologies in rhinoplasty also face technological challenges. For example, integrating robotics into surgical processes requires high-precision instruments and sophisticated control algorithms. Smith and colleagues' study (2022) [19] emphasizes the importance of further refining robot mechanisms and software to ensure the stability and predictability of robotic procedures.

With the expanding capabilities in rhinoplasty, ethical and patient transparency issues arise. The widespread implementation of three-dimensional technologies and 3D printing raises discussions about patient data confidentiality and the obligation to provide clear information about potential outcomes. Johnson and colleagues' work (2021) [20] analyzes ethical and sociocultural aspects of modern rhinoplasty, arguing for the need to develop standards and regulations.

Standardization of processes in modern rhinoplasty plays a crucial role in ensuring unified quality criteria and results. Chen and colleagues' research (2020) [21] emphasizes the importance of establishing training programs based on modern technologies to ensure a high level of competence and expertise among surgeons in this field. One of the promising directions in modern rhinoplasty is the innovative use of materials and biotechnologies. Huang and colleagues' study (2023) [22] provides an overview of recent advancements in biomaterials and cell engineering technologies for creating more durable and functional implants.

CONCLUSION

Modern rhinoplasty faces unique challenges and opportunities in light of rapid technological advancement and medical progress. The overview of these aspects presented in this article emphasizes the significance of continuous research, innovation, and refinement of techniques in this field. One central conclusion is the synthesis of technologies. Various methods, such as three-dimensional technologies, 3D printing, robotics, and biomaterials, acquire a new dimension in rhinoplasty. The integration of these methods not only enhances precision and predictability but also provides surgeons with new tools for individualized and efficient interventions. Serious challenges, such as technological limitations, ethical issues, and surgical training, require further investigation. Continuing efforts to overcome technological barriers, develop effective training programs, and establish ethical standards will be a key focus of future research. Biotechnologies and innovations in biomaterials represent a promising path for future development. Creating biologically compatible and functional implants opens new horizons in reconstruction, contributing to improved outcomes and reduced risks of postoperative complications. Supporting the standardization of processes, both in technological and educational aspects, is a crucial step in the advancement of rhinoplasty. Collaborative research and knowledge exchange can serve as the foundation for establishing widely accepted norms and standards in this field.

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Research Article

CISTANCHE MONGOLIA GENERAL PHARMACOLOGICAL AND ANTI-DEPRESSION PROPERTIES OF THE EXTRACT

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ABSTRACT

Although time rapidly develops, it has not failed to show its influence on humanity. The abundance of information, noise, the development of the Internet, etc. affect the human psyche. Today, the demand for antidepressants is growing. Of course, the low side effects of the drug, long dosage interval, and naturalness lead to many advantages. The purpose of this research is to study the toxicity and general pharmacological properties of an extract prepared from the plant Cistanche Mongolica, growing wild in the Republic of Uzbekistan, as well as to determine the antidepressant properties of this extract.

KEYWORDS

Plant extract Cistanche Mongolian, pharmacology, general pharmacological properties, acute toxicity of the substance after oral administration, antidepressant properties.

INTRODUCTION

This scientific article presents the toxic-pharmacological properties of Cistanche plants, which belong to the paniculate family. Nowadays, it is very important to find effective medicinal substances from local plants. [1;3;5] Cistanche is widely used in traditional Chinese medicine. Abroad Cistanche tubularis is widely used in the treatment of osteoporosis (OP), Alzheimer's disease (AD), and male sexual dysfunction (MSD). Cistanches Herba is used to treat kidney failure, female infertility, abnormal discharge, and constipation in old age. [2;4] Considering the above, we analyzed some pharmacological properties and acute toxicity of Cistanche Mongolia, growing in the Fergana region of

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the Republic of Uzbekistan. Information about this study is provided below.

Purpose of the research: Determination of acute toxicity and general pharmacological properties of the extract isolated from the above-ground and underground parts of the plant.

MATERIALS AND METHODS OF THE RESEARCH

Academician S.Yu carried out the experiments at the Institute of Chemistry of Plant Substances of the Academy of Sciences of the Republic of Uzbekistan named after Yunusov. The object of the research is a cistanche collected from the Fergana State Natural Monument, located in the Ezevon district of the Fergana region. Mongolia is an extract isolated from the aboveground and underground parts of the ghee plant. The plant stem was extracted with 80% ethanol. Animals were randomly selected and kept in cages for at least 5 days before admission to ensure acclimation to laboratory conditions. The experiments were conducted on 60 white female mice weighing 18-22 g. During the experiment, the acute toxicity of the substance was determined. Experiments to study general pharmacological properties were conducted on rabbits weighing 1.5-2 kg, and white laboratory rats weighing 200-220 g. All animal treatments were carried out according to the requirements of international recommendations of the European Convention for the Protection of Vertebrate Animals used for experiments or other scientific purposes [6]. To study the local effect of the drug, an experiment was conducted on rabbits by applying it to a previously cut (4x5 cm) area of the back skin Cistanche extract Mongolian used as a solution, 4 drops every day for 20 days. The control group of animals was treated with saline under the same conditions.

In order to study the effect of the drug on the mucous membrane of the eye, it was assessed by instilling the test substance into the conjunctival sac of a rabbit's eye.

In order to study the cumulative nature of the drug, an experiment was conducted on white rats. Cistanche Mongolian extract 50-100 mg/kg and 200 mg/kg were tested daily for 20 days. The control group of animals was injected with saline solution under similar conditions. During the experiment, the general condition, weight, behavior, condition of the scalp, mucous membranes, and food and water consumption were monitored.

The permitted dose of the drug was administered intraperitoneally on the 21st day from the start of the experiment. Control animals were injected with saline solution on day 21 according to a similar schedule.

Quantitative data obtained from the study is a t-test Student's test using variation statistics using STATISTICA version 6 StatSoft, Inc. (2001) and analyzed using a numerically accelerated method based on a static table to evaluate pharmacological effectiveness.

RESULTS AND ITS DISCUSSION

Cistanche acute toxicity of the extract obtained from the above-ground and underground parts of the Mongolica plant was carried out on white mice. During the experiments, the test substance was administered orally in doses ranging from 1000 mg/kg to 10,000 mg/kg and observed for the first 3-4 hours and 7-14 days. In small doses, practically no side effects were observed. At doses above 8000 mg/kg, rapid breathing, increased heart rate, and decreased mobility were initially observed. With an increase in dose, no lethal outcome was observed in the first 3-4

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hours. The results obtained from the experiments are presented in Table 1 below.

Table 1

Results of acute toxicity of Cistanche Mongolica plant extract in white mice

No.	Substance name	Dose mg/kg	Number of animals	Death toll	Number of survivors	% survivors
1.	*Cistanche Mongolian*	1000	10	0	10	100
2.	*Cistanche Mongolian*	3000	10	0	10	100
3.	*Cistanche Mongolian*	5000	10	0	10	100
4.	*Cistanche Mongolian*	7000	10	0	10	100
5.	*Cistanche Mongolian*	8000	10	0	10	100
6.	*Cistanche Mongolian*	10,000	10	0	10	100

As a result of the experiments, it is clear that the acute toxicity of the Cistanche Mongolica plant extract was LD 50, which was more than 10,000 mg/kg when administered orally. In terms of acute toxicity, the substance belongs to class V and is considered harmless.

Experiments conducted to study the effect properties showed that the drug did not have any effect on the skin when applied repeatedly to the skin (20 times). When introduced into the conjunctival sac of the eye, there was no hyperemia of the mucous membrane and lacrimation.

The results of the cumulative effect study showed that the drug did not cause significant changes in general conditions and behavior during the experiment. All animals were eating well and gaining weight. No animal deaths were recorded.

Thus, Cistanche extract Mongolica does not cause the accumulation of substances in the body of animals.

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Cistanche Mongolian extract does not have an irritating effect on the skin and mucous membranes of the eyes of experimental animals with single or repeated use.

Cistanche Mongolica extract with repeated use to the cumulative function doesn't have

With long-term use, it does not accumulate in the animal's body and does not have a toxic effect.

CONCLUSION

Thus, the acute toxicity of the Cistanche Mongolica plant extract has been established. was more than 10,000 mg/kg when taken orally. In terms of acute toxicity, the substance is practically harmless and belongs to class V. 50 at doses studied; 100 and 200 mg/kg do not irritate the skin. When introduced into the conjunctival sac of the eye, there was no hyperemia of the mucous membrane and lacrimation. It is not cumulative.

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Research Article

JUSTIFICATION OF MINIMALLY INVASIVE SURGICAL METHODS FOR THE TREATMENT OF DECOMPENSATED FORMS OF VARICOSE VEINS OF THE LOWER EXTREMITIES

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ABSTRACT

The results of surgical treatment of 71 patients with chronic venous insufficiency (CVI) of types C-4 (34), C-5 (17), C-6 (20) were analyzed. Of these, 34 patients of the main group underwent minimally invasive interventions. The sufficient effectiveness of crossectomy, supplemented by sclerotherapy, has been proven, allowing more than 80% of cases to avoid traumatic interventions.

KEYWORDS

CVI, crossectomy, sclerotherapy.

INTRODUCTION

In recent years, the number of patients suffering from chronic venous insufficiency of the lower extremities (CVI) has been sharply increasing due to young people who are extremely demanding of the cosmetic results of surgery [3, 6].

At the same time, trophic ulcers in 50-60% of cases are found in gerontological patients, in whom the performance of the Linton operation, due to its invasiveness and high incidence of purulent complications, is extremely limited [1, 2, 3].

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Today, in traditional surgical treatment of varicose veins, operations with wide surgical access predominate. These operations are characterized by high invasiveness, remain unsatisfactory from the point of view of aesthetic requirements, are accompanied by a high incidence of purulent-inflammatory complications and a long period of postoperative rehabilitation [4, 5].

The recurrence rate of the disease reaches 50% within 5 years after surgery and can increase to 80% in the more distant period [6].

Aim of the study

The aim of the study was to optimize the surgical treatment of patients with CVI of the lower extremities by using methods of minimally invasive correction of venous hypertension.

MATERIALS AND METHODS

Today, clinicians use the CEAP (Clinical, Etiology, Anatomy, Pathophysiology) classification of CVI. The clinical section consists of 7 types. Trophic changes are present in patients of type C-4, C-5 and C-6.

In the period from 2010 to 2019, 867 patients with varicose veins of the lower extremities were operated on in the surgical department of the 1st clinic of the SamMI, of which 71 (8.2%) had CVI type C-4 (34), C-5 (17) and C-6 (20).

Color duplex scanning was used to assess venous hemodynamics.

The indications for surgical correction of venous hypertension were:

- Insufficiency of perforating veins, when their diameter, established by ultrasound examination, was more than 5 mm;
- Multiperforant insufficiency at any stage of CVI;
- Severe trophic skin changes in the area of the perforating veins.

Depending on the surgical tactics, the patients were divided into two groups. In the main group (34), minimally invasive interventions were performed, in the comparison group (37) CVI with trophic changes was eliminated by traditional means (table 1).

Table 1.

Distribution of patients according to surgical treatment tactics (n=71)

Surgical tactics	Number of patients	
	Abs.	%
Main group, (n=34)		
Crossectomy+Coquette+sclerotherapy	22	64,7%
Crossectomy+sclerotherapy	12	35,3%
Comparison group, (n=37)		
Linton's operation	14	37,8%
Linton operation + combined. phlebectomy	18	48,6%
Linton operation + crossectomy	5	13,6%

Table 2 presents the characteristics of the compared groups, which took into account age, gender, degree and cause of CVI.

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Table 2.

Characteristics of the compared groups

Parameters of the study groups	Main group, n=34	Comparison group, n=37
Age, years	44,5 ± 15,2	44,4 ± 12,2
Min	18	22
Max	73	68
Gender (Male/Female)	17/9	12/5
CVI (S-4 and S-5/S-6)	12/13	8/10
Cause of CVI: primary varicose veins/PTFS	9/25	25/12

In the main group of patients, crossectomy was performed through a mini-incision, and at the end of the operation, intradermal sutures were applied with satisfactory cosmetic effect in the long-term postoperative period. In cases of non-healing trophic ulcers, phlebectomy was supplemented with sclerotherapy. For sclerotherapy, 10mg of etoxisclerol was used.

RESULTS OF THE STUDY

The duration of the operation in patients in the main group was shorter than in the comparison group, and also the patients in the main group recovered earlier. In the comparison group, 10 patients had purulent-necrotic complications of the operation site in the early postoperative period (table 3).

Table 3.

Immediate results of surgical treatment

Index	Main group, n=34	Comparison group, n=37
Duration of intervention, min	53,2±4,7	102,6±7,6
Patient activation time, days	1,13±0,08	3,0±0
Bed day	3,98±0,6	22,9±2,5
Period of epithelization of ulcers, days	14,3±3,8	20,2±6,9
Purulent-necrotic complications of the intervention area	0	10 (27,0%)

In the course of a month, in 84.6% of cases, the ulcer was completely healed in the main group of patients, while in the comparison group this indicator was 70% (table 4).

Table 4.

Dynamics of healing of trophic ulcers

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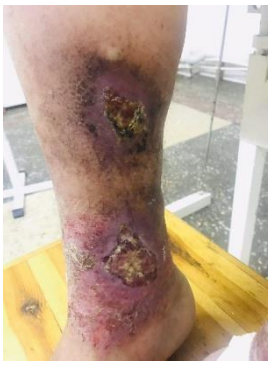
Group	Total patients	C-6	Complete healing of ulcers within 1 month.	
			abs.	%
Main group	34	13	11	84,6
Comparison group	37	10	7	70,0
Total	71	23	18	78,3%

In the long-term period, 49 patients were observed. During the examination of patients, attention was paid to the local clinical symptoms (table 5). In the main group of patients, one year after the operation, almost all of them had no pain or swelling of the lower extremities, trophic ulcers completely healed, and the quality of life of patients improved (figure 1).

Table 5.

Оценка отдаленных результатов хирургического лечения ХВН

Clinical symptoms	Main group, n=29		Comparison group, n=20	
	Before surgery	1 year after surgery	Before surgery	1 year after surgery
Pain	2,06±0,11	0,35±0,23	1,75±0,40	0,40±0,26
Varicose veins	2,41±0,24	0,29±0,22	1,80±0,37	0,45±0,22
Venous edema	1,06±0,49	0,41±0,29	1,35±0,50	0,30±0,21
Skin pigmentation	0,35±0,37	0,18±0,19	1,00±0,40	0,75±0,31
Skin inflammation	-	-	0,35±0,31	-
Induration (thickening) of the skin	0,53±0,30	0,12±0,16	1,75±0,31	1,00±0,28
Number of open ulcers	0,47±0,24	0,12±0,15	0,60±0,33	0,05±0,098
Duration of existence of an open ulcer	0,47±0,24	0,29±0,40	1,55±0,59	0,10±1,196
Size of largest open ulcer	0,65±0,37	0,12±0,16	1,05±0,52	0,05±0,098
Compression therapy	1,9±0,12	1,65±0,29	2,80±0,23	0,40±0,298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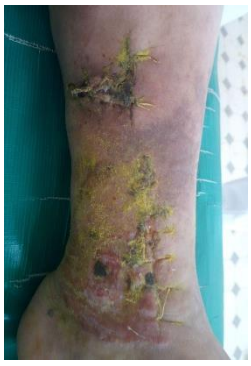
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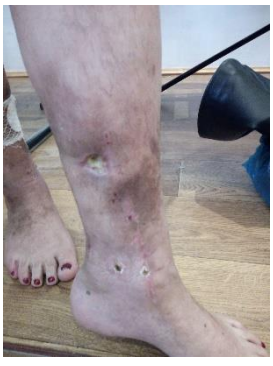
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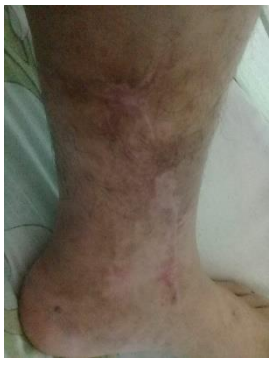

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Pic.1. A patient with CVI complicated by a trophic ulcer before and after complex treatment: a) condition of the lower limb upon admission; b) the condition of the lower limb on the 10th day after phlebectomy, supplemented with sclerotherapy; c) 3 months after complex treatment; G). after 8 months after complex treatment.

CONCLUSIONS

1. Sonographic assessment of venous hemodynamics of the lower extremities demonstrates that trophic disorders in CVI are not only due to perforating insufficiency, but also to reflux of blood flow through superficial veins. The severity and duration of trophic disorders of the lower extremities have a direct correlation with the severity of horizontal reflux.
2. The pathogenetically important component of surgical treatment of decompensated forms of CVI should be considered dissection of perforating veins and elimination of pathological reflux along the subcutaneous veins.
3. Crossectomy, supplemented with sclerotherapy, can be a sufficiently effective arsenal of complex treatment of CVI, which in more than 80% of cases allows to avoid more traumatic surgical interventions, and is distinguished by cosmetic results.

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Research Article

CHRONIC VENOUS INSUFFICIENCY AND TROPHIC ULCERS OF THE LOWER EXTREMITIES

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ABSTRACT

Chronic venous hypertension (CVH) triggers a whole cascade of pathological reactions, the ultimate result of which is gross changes in the trophism of soft tissues of the lower extremities. The main hemodynamic factor leading to hypertension in the superficial venous system and, subsequently, to trophic changes in the lower limb, is blood reflux from deep veins, and it is associated with valve insufficiency at the mouth of the great and small saphenous veins (vertical reflux), as well as incompetency of perforators (horizontal reflux). Moreover, 90% of the latter are localized in the calf region, of which 87% belong to the veins of the Cockett I-III zone.

KEYWORDS

Chronic venous insufficiency, trophic ulcers.

INTRODUCTION

Chronic venous insufficiency (CVI) can be considered a general medical problem, since doctors of various specialties encounter it every day. CVI is characterized by a progressive and often complicated course, with significant social and economic consequences. This is due to the prevalence of the pathology, the high cost of diagnosis and treatment, as well as the long periods of disability of patients. Numerous epidemiological studies show that the incidence of CVI in some population groups is no less than 60-75% of observations [6, 7]. Based on international research

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data, V.S. Savelyev and A.N. Kiriyenko rightly call CVI a "disease of civilization" [2,4].

Another important aspect of the problem is that against the background of existing CVI, the risk of acute thrombosis of the deep venous system of the inferior vena cava (IVC) sharply increases, which is known to be extremely dangerous with the likelihood of developing such a formidable complication as pulmonary embolism, characterized by high mortality.

Recently, the number of patients suffering from CVI has begun to increase sharply, largely due to young people [11,14], who, as is known, are extremely demanding regarding the cosmetic results of surgical correction of this disease. The next aspect is associated with patients of the older age group due to the difficulties encountered in the treatment of venous trophic ulcers, which develop mainly in people with a long history of CVI [6, 7, 8]. Moreover, in 50-60% of gerontological patients, due to severe concomitant pathology and the extensiveness of the ulcerative surface, performing the traditional Linton operation in such cases, due to its traumatic nature and high frequency of purulent complications, turns out to be very problematic. At the same time, refusal of surgical intervention and limitation of only conservative measures for the management of venous ulcers is associated with an extremely long recurrent course of the disease, leading to persistent disability of patients, and ultimately extremely low cure rates [3].

Based on the fact that surgery is still considered the most effective and "radical" type of treatment for many manifestations of CVI, more than 80% of patients with VD are operated on in general surgical hospitals. At the same time, it is well known that the results of such operations are significantly inferior to those of specialized departments and centers [10]. Traditional surgical treatment is dominated by operations of a standard volume, which are often insufficient in some situations and excessive in others. At the same time they are distinguished by hightraumatic, remaining unsatisfactory in terms of aesthetic requirements, and are accompanied by a long period of postoperative rehabilitation. Unfortunately, the frequency of relapses with existing types of surgical treatment is quite high, and the risks of their occurrence are estimated as 50% for every 5 years after surgery, and, depending on the follow-up period, range from 20 to 80% [9,11].

The insufficient effectiveness of surgical treatment is often due to late presentation of patients, when surgical treatment is not able to eliminate all the symptoms of CVI. This is due to shortcomings in the work of the outpatient department and delayed diagnosis, and above all, the absence and underestimation of the results of ultrasound angioscanning, which is currently the main method for identifying phlebohemodynamic disorders.

The main hemodynamic factor leading to hypertension in

superficial venous system and, subsequently, to trophic changes in the lower limb, is the discharge of blood from the deep veins, and it is associated with insufficiency of the valves at the mouth of the great and small saphenous veins (vertical reflux), as well as the failure of perforators (horizontal reflux). Moreover, 90% of the latter are localized in the lower leg area, of which 87% belong to the veins of the Cockett zone I-III.

Subsequently, pathological reflux is aggravated by dysfunction of the muscle pump of the lower extremities, especially in patients with limited physical activity. Long-term hemodynamic disturbances invariably lead to disturbances at the microcirculatory

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level. Constant venous hypertension causes the development of skin trophic changes with hyperpigmentation, fibrosis of subcutaneous fat and, finally, a trophic ulcer.

Insufficiency of the valves of the deep venous system, as a rule, is a consequence of deep vein thrombosis. Incompetence of the saphenous vein valves can be primary, as a result of low tone of the vascular wall or weakness of their valves, and secondary, as a consequence of previous phlebitis, stretching of the venous wall during hormonal therapy or due to a transmittable increase in pressure in the areas of connection with the deep venous system, more often - at the sapheno-femoral and sapheno-popliteal anastomosis [12]. In the latter case, varicose veins of the saphenous veins form in the proximal part and subsequently spread to the distal parts of the limb.

In horizontal reflux, the action of the muscular pump forces blood under pressure back into the saphenous veins through incompetent perforator valves. Due to the resulting venous hypertension, there is an expansion of the venous wall and, as a consequence, secondary incompetence of the saphenous vein valves [18].

Obstruction of the deep veins can significantly limit blood flow from the limb, causing a sharp increase in venous pressure during contraction of the lower leg muscles and secondary dysfunction of the muscle pump. A mechanical obstruction to the outflow of blood through the deep veins can be caused by purely "venous" reasons, such as PTF with inadequate recanalization or stenosis of the lumen of the vessel, or external factors such as May-Thurner syndrome (compression of the left common iliac vein passing between the right common iliac artery and lumbosacral region) [12]. Some researchers are inclined to believe that mechanical obstructions to the outflow of blood from the lower extremities have a more important role in the pathogenesis of CVI than previously thought [8].

Impaired function of the muscle pump of the limb causes a decrease in the efficiency of emptying its distal parts. Muscular dysfunction of the venous outflow rarely develops primarily as a consequence of neuromuscular diseases or muscle atrophy. Typically, the pumping function of the muscles becomes unproductive due to severe perforating insufficiency or deep vein obstruction. At the same time, the transfer hydrodynamic pressure exerted from the deep venous system to the superficial one remains high both in conditions of active movements and during any movements that occur after long-term rest. Today, muscle pump dysfunction is considered one of the main mechanisms for the development of secondary varicose veins of the saphenous veins and its complications, incl. and trophic ulcers.

It is known that the severity of hemodynamic and trophic disorders is determined not by the type of anastomosis, but by the level of its location. Certainly, the shunt pressure will be greater the more distal the incompetent perforating vein is located. In this case, the high pressure caused by retrograde blood flow from the proximal parts of the superficial venous system is joined by even higher pressure from the deep system, transmitted through incompetent perforators.

Acting as a permanent distal obstacle to venous circulation, gravity is present in all aspects of the pathogenesis of CVI and dominates all generally known interpretations of the development of venous pathology. A chronic increase in venous pressure, most pronounced in the distal parts of the leg, leads to leveling of the arteriolar-venular gradient, slowdown, and in advanced cases, stasis of the microvasculature

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with subsequent hypoxia and tissue edema, and, finally, the development of trophic disorders [2, 4] .

Clinically significant disturbances in the hemodynamics of large veins are inevitably transmitted to the level of microcirculation of the lower limb and ultimately lead to the development of venous microangiopathy [2]. Morphologically, microangiopathy is manifested by elongation, expansion and tortuosity of the capillary networks, thickening of the basement membrane with an increase in the content of collagen and elastic fibers, damage to the endothelium with expansion of the interendothelial spaces, increased pericapillary edema with the formation of a fibrous halo. Pathologically altered capillaries with increased permeability and high venous pressure lead to the accumulation of excess fluid, macromolecules and extravasation of red blood cells into the interstitial substance of tissues. In addition to the pathomorphosis of the microvascular bed and connective tissue, changes in the lymphatic network and nervous system of the limb are soon added. Fragmentation and destruction of microlymphatic vessels further aggravate the drainage system of the limb, and disruption of innervation is fraught with a complete loss of microcirculatory tone.

Several mechanisms have been formulated in the literature that determine the occurrence and development of venous microangiopathy, which, in particular, include the theory of fibrin cuff formation, growth factor stimulation and accumulation of white blood cells. According to the fibrin cuff theory, excess fibrin-rich tissue fluid accumulates in the pericapillary space. This extremely weak fibrinolysis cuff promotes thickening of the diffusion barrier, inhibits repair processes and supports the inflammatory response. As fibrin thickness increases and other macromolecules accumulate, healing processes become impossible. Closely related to this theory is another mechanism, according to which fibrin, which progressively accumulates in the area of edema and ischemia, stimulates growth factor and attracts macromolecules to this area, which makes it impossible to fully initiate healing mechanisms. A decrease in the number of functioning capillaries and impaired regulation of vascular tone leads to a decrease in the reactivity and functional reserve of the microvasculature. [24,25,27]

Further, the accumulation of white blood cells in capillaries and post-capillary venules, their adhesion and activation continues, accompanied by the release of inflammatory mediators and proteolytic enzymes with damage to the endothelium, which, in turn, increases vascular permeability and blood stagnation.

Tissue hypoxia activates endothelial cells, which also release inflammatory mediators and mitogenetic molecules. Inflammatory mediators, completing the pathological chain, induce adhesion and aggregation of leukocytes and indirectly induce proliferation of smooth muscle cells. The result of inflammation is an increase in capillary permeability, the development of edema, damage to the endothelium by oxygen free radicals, aggregation and adhesion of neutrophils and platelets, and the release of coagulation factors with the formation of platelet clots. In addition, the rheological properties of blood change towards pronounced hypercoagulation and a tendency to thrombus formation [16,17].

Proteolytic enzymes and the free radicals released can also damage numerous other biological structures, such as collagen. Proliferating smooth muscle cells change their phenotype and lose the ability to physiologically contract, unlike a healthy venous wall. Tissue hypoxia and leukocyte aggression cause tissue damage, the occurrence of edema, lipodermatosclerosis and trophic ulcers of the limb in its distal part.

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Thus, chronic venous hypertension triggers a whole cascade of pathological reactions, the end result of which is gross changes in the trophism of the soft tissues of the lower extremities [5, 14, 24, 30].

Diagnosis of CVI today is not very difficult and is based primarily on clinical and anamnestic data. The main purpose of examining the patient is to assess the anatomical and functional state of the inferior vena cava (IVC) system. When diagnosing primary varicose veins, it is necessary to differentiate it from varicose dilation of the saphenous veins that occurs during postthrombophlebitic syndrome, as well as from congenital varicose dilation of the saphenous veins due to the discharge of arterial blood into the venous system through multiple network-like arteriovenous anastomoses in Klippel-Trenaunay and Parkes diseases. Weber.

It is equally important to differentiate a trophic ulcer in varicose veins from an ischemic ulcer of the leg in Martorell syndrome, which is based on arterial hypertension. Ischemic ulcers with Martorell syndrome occur more often in older women. The disease is characterized by constant sharp pain in the distal parts of the leg, where spots appear, followed by the formation of ulcers in the absence of skin pigmentation, disorders of regional venous and arterial circulation. [15]

With an undoubtedly clear diagnosis of diseases of the venous system, which does not require surgical correction, we can limit ourselves only to a clinical examination. Auxiliary diagnostic methods used in clinical practice are plethysmography, computed spiral tomography, magnetic resonance imaging, phlebotonometry, oscillography, and intravascular ultrasonography.

X-ray contrast venography allows you to visualize deep and superficial veins, obtain information about the condition of the valve apparatus, its competence or failure and other morphological changes in the venous system. However, the widespread use of this method is associated with a number of disadvantages: invasiveness, radiation exposure to the patient and staff, the risk of complications, the impossibility of frequent repetition, and high cost. Therefore, today it is used in complex diagnostic situations, as well as in preparing patients for reconstructive or endoscopic interventions [13,14,19].

Due to the improvement of ultrasound methods in recent years, the demand for traditional functional tests and radiopaque venography has noticeably decreased [7,13,15].

Using Doppler ultrasound, sound information is obtained that allows one to verify the presence or absence of blood flow through the main veins, and in combination with functional tests, it helps to detect reflux of blood from the deep venous system to the superficial one. This examination method is safe for the patient, has a lower cost and is widely available. However, this technique has low sensitivity and specificity compared to color duplex ultrasound scanning. [14]

Today, the main method for assessing the state of the IVC system is duplex scanning with color Doppler mapping, which can answer almost all questions of interest in assessing the anatomical and functional state of the IVC system: 1) the presence of incompetence of the sapheno-femoral and sapheno-popliteal anastomosis; 2) the prevalence of reflux in the saphenous veins and their diameter; 3) localization, diameter and functional state of perforating veins; 4) the state of the deep venous system, including the consistency of the valve apparatus, signs of previous

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venous thrombosis, localization of blood clots, as well as the presence of their flotation [5, 17, 27, 28, 31].

With the beginning of the widespread use of CDS, the authors' priorities for many details of treatment radically changed. So, according to Ricci S. et al. (27) when performing CDS in patients of clinical class C4-C6, in 26.7% of cases, no hemodynamically significant perforating veins were detected. On the contrary, in patients with lymphostasis and edema, many small incompetent PVs can be identified [13]. But at the same time, they do not require surgical correction, since they play a compensatory role in conditions of sclerotic tissue.

Undoubtedly, the question of the hemodynamic significance of perforating veins of various groups has not been resolved. All the more importance should be attached to constant CDS monitoring of this group of patients and assessment of changes in hemodynamics after treatment. Summarizing the above, it is necessary to emphasize the introduction of "the art of seeing the invisible" (J. Swift), assessing and providing complete information about the state of the venous system leads to the fact that many pathological processes under the targeted central nervous system have become accessible to minimally invasive treatment methods.

Recently, significant progress has been made in the development of diagnosis and assessment of the severity of venous dysfunction. In this regard, in 1994, experts from the consensus group of the American Venous Forum developed the CEAP classification. The CEAP classification covers clinical, etiological, anatomical and pathophysiological signs, which is why researchers from different countries were able to achieve standardization and objectification of results in their work and compare the effectiveness of various treatment methods. [17]

The clinical section of the classification describes the clinical status of the patient. The reason for classifying a patient into one class or another is the presence of the most pronounced objective symptom of CVI. In defining the clinical section of CEAP, it is more correct to use the term "class"; the terms "stage" and "form" are not suitable in this case. There is no consistent relationship between the classes of CVI; the disease can manifest itself immediately, for example, with edema and even trophic disorders. [14] CO - no visible or palpable signs of CVI C1 - telangiectasia or reticular varicose veins C2 - varicose saphenous veins (diameter more than 3 mm) C3 - edema C4 - trophic changes in the skin and subcutaneous tissues a - hyperpigmentation and/or venous eczema b - lipodermatosclerosis and/or white skin atrophy C5 - healed ulcer C6 - open venous ulcer.

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