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Sadržaj / Table of Contents

Clinical evaluation of GelcoPEP Beauty: a new hydrolyzed collagen that provides improvements in the skin, including firmness factors, fine lines, wrinkles, and elasticity

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Abstract

Summary: The dietary supplements industry emphasizes the clinical trials importance to ensure the products safety and efficiency. Comparing various products and validating claims are crucial to guarantee market's credibility and trust.

Objective: The aim of the study was to compare the effects of GelcoPEP Beauty hydrolyzed collagen with the benchmark product, through a single-blind, randomized, placebo-controlled study, analyzing and comparing the supplementation effects.

Method: A questionnaire was administered, elasticity and firmness measurements by Cutometer® Dual MPA 580 and image analysis for wrinkles and fine lines captures by VISIA® CR.

Results: The tests showed general improvement in skin aesthetics, including elasticity, firmness, and reduction in expression lines.

Conclusion: GelcoPEP Beauty hydrolyzed collagen demonstrated significant benefits for skin health, especially increasing elasticity, comparable result with the benchmark product.

Key words: hydrolyzed collagen; dietary supplement; skin; comparative study; placebo-controlled.

Introduction

In recent years, the dietary supplement industries have grown, as well the concern to develop effective and safe products. The industry's awareness and the demands of consumers and regulatory institutes have led supplement manufacturers to adopt procedures to allow them to understand better their products. These include perform clinical safety and effects tests coordinated by specialists before marketing a product. These procedures provide companies with greater security, credibility, and reliability with their consumers (9).

Effects studies allow evaluating the product's characteristics, detecting complaints and additional comments regarding its performance, as well as testing quality control, competitor analysis and claims support. To assess whether a claim is appropriate, it is necessary to consider the general impression of consumers regarding the product presentation or advertisement (9).

Claims must be supported by solid, clear and relevant evidence. The evidence can be in experimental studies (biochemical/instrumental methods, sensory evaluations, technical evaluations, and evaluations without participation of research participants – in vitro tests in cell culture, use of hair strands) and consumer evaluations (1).

Clinical and/or self-assessment studies and instrumental studies can be used to evaluate the products effects. Cutaneous bioengineering or cutaneous biometry consists of studying the biological, mechanical, and functional characteristics of the skin by rigorously measuring certain variables using scientific and non-invasive methods (11).

The main parameters that can be used to evaluate a product's effectiveness on the skin are morphological changes to the skin's surface, stratum corneum hydration and sebum secretion. Due to variation in parameters between different anatomical regions in the same individual, and between different individuals, these techniques are used to comparatively measure variation in the same parameter, in the same local, before and after using a product (10).

The self-evaluation by the study participants is based on the "Standard Guide for Sensory Claim Substantiation" (1) through questionnaire application. The "Standard Guide for Sensory Claim Substantiation" is an ASTM norm that aims to disseminate good practices in sensory tests and approach reasonable practices for conducting tests that validate claims regarding product's attributes.

Objective

Compare the dietary supplement effectiveness under normal conditions of use, using the parameters of skin firmness and elasticity, fine lines and wrinkles analysis and participants effects evaluation.

Methods

A comparative, single-blind, randomized, clinical study was conducted with the investigational product, benchmark product and placebo.

Participants

84 participants were included, with the aim of completing the study with 60 responses, according to the criteria in the tables below.

Table 1. Participants characteristics

Characteristics of the selected participants Investigational Product	
Nº of participants included	28
Gender	F
Age (years)	46 - 69
Characteristics of the selected participants Benchmark Product	
Nº of participants included	28
Gender	F
Age (years)	47 - 70
Characteristics of the selected participants Placebo	
Nº of participants included	28
Gender	F
Age (years)	45 - 70

Table 2. Inclusion criteria

Inclusion criteria
• Healthy study participants; • Intact skin in the study region; • Agreement to adhere to the study procedures and requirements and to attend the Institute on the day(s) set for the evaluations; • Ability to consent to their participation in the study; • Age over 45 years; • Female participants; • Participants with facial sagging – verified by the specialist evaluator; • Participants with wrinkles/fine lines of, at least, grade II in the periorbital region - verified by the specialist evaluator, and according to the institute's scale; • Participants vaccinated for COVID-19.

Table 3. Exclusion criteria

Exclusion Criteria
• Pregnancy and/or breastfeeding; • Skin pathology in the valuation area; • Type 1 diabetes mellitus; insulin-dependent diabetes; presence of diabetes related complications (retinopathy, nephropathy, neuropathy); presence of diabetes-related dermatoses (plantar ulcer, lipoid necrobiosis, granuloma annulare, opportunistic infections); history of episodes of hypoglycemia, diabetic ketoacidosis and/or hyperosmolar coma; • Immune insufficiency; • Current use of the following topical or systemic medications: Corticosteroids, immunosuppressants and antihistamines; • Skin diseases: vitiligo, psoriasis, atopic dermatitis; • Previous history of reaction to the category of products tested; • Other diseases or medications that could directly interfere with the study or put the study participant's health a risk.

Table 4. Restrictions during study

Restrictions during study
• Do not apply any product to the experimental area that could interfere with the evaluation of the study; • Do not change cosmetic habits, including hygiene; • Do not change eating or exercise habits during the study period.

Products

Investigational Product - GelcoPEP Beauty
Name: E004121A-01
Batch: 04CH2300039
Composition: Hydrolyzed collagen

Benchmark Product
Name: E004121A-03
Batch: H4508072
Composition: Hydrolyzed collagen

Placebo
Name: E004121A-04
Batch: DE 2815
Composition: Maltodextrin

Participants received a kit containing sachets with the investigational, benchmark product or placebo, according to randomization, and were instructed to use the product according to the instructions: Dissolve the entire content of 1 sachet in a glass of water, mix and drink. Use the product every day, once a day, preferably at the same time.

Consent of Research Participants

At the first visit (T0), the study participants were informed of the aim of the study, methodology and duration, risks, possible expected benefits and restrictions linked to the study and signed the Informed Consent Form and the Image Disclosure Consent Form (2).

Application and Investigation Period

The total study duration per participant was 60±2 days.

Analyzed Parameters

At the initial visit (T0), a specialist assessor evaluated the participants to verify the inclusion or exclusion criteria for the study. Participants were supervised by trained technicians throughout the study and evaluated by specialist doctors if any symptoms or signs appeared, to confirm the correct use of the products and detect any possible adverse events.

Wrinkles and Fine Lines

Facial images where taken using the equipment VISIA® CR, which takes digital photographs of the face and emits different types of light beams to evaluate wrinkles and fine lines at T0 (before using the products) and T60 (after 60 ± 2 days of using the products), by comparing and analyzing the images using specific software.

The participant identity was preserved and the consent to obtain and disclose the images was given in writing by signing the Consent Form for Image Disclosure.

To assess wrinkles and fine lines were used Standard 2 images. A region of interest (ROI) was selected on the participants' image and the parameters were measured within the ROI. To ensure that the software does not consider irregularities and points that are not relevant to the analysis, the parameters are adjusted.

The analysis was performed using FrameScan® software and the following parameter were assessed: visibility coefficient (number of wrinkles/fine lines visible within the area assessed) and occupancy rate (area occupied by the wrinkle/fine line within the area assessed). A value reduction of each parameter indicates a reduction in wrinkles/fine lines.

Firmness and Elasticity

To analyze skin firmness and elasticity, the Cutometer® Dual MPA 580 was used. The measurement principle with the equipment is based on skin suction and stretching (*3, 4*).

The equipment generates a negative pressure and the evaluated skin area penetrates the probe. The skin penetration length into the opening is

determined by contact with an optical measuring system, composed of glass prisms that transmit light from the emitter to the detector, the amount of light reaching the receiver is proportional to the skin penetration length into the opening. The process is repeated immediately, obtaining consecutive curves.

The obtained curve reflects the skin viscoelastic properties. This curve consists of two parts in the suction phase and a relaxation phase. In the first part of suction, the curve slope is perpendicular. In the second part, there is a progressive flattening until it reaches a maximum at the end of the suction phase (figure 1).

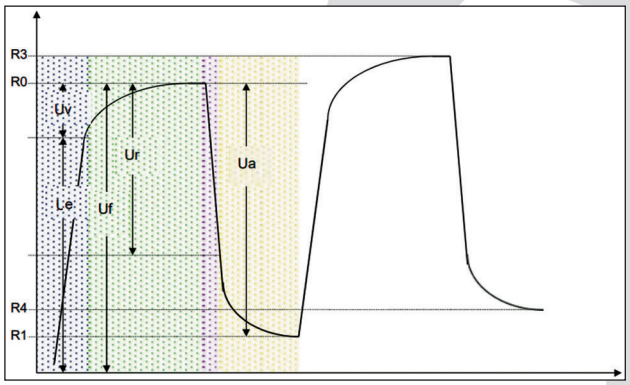

Figure 1. Curve generated by Cutometer® Dual MPA 580

After reading, the parameters R0 to R8 are obtained (table 5).

The parameters R0 and R5 were used to assess skin firmness and elasticity. The decrease of R0 value indicates an increase in firmness. The parameter R5 is related to skin elasticity and the higher and closer to one (01) the value is, the more elastic the skin is. Measurements were taken in the right or left malar region, according to randomization, at T0 (before using the products), T30 (after 30 ± 2 days of using the products) and T60 (after 60 ± 2 days of using the products).

Effectiveness Evaluation Questionnaire

Participants answered an effectiveness evaluation questionnaire, at T30 and T60, listed in table 6.

Statistical Analysis

Exploratory analyses were performed for the collected data, according to the analysis nature.

The effectiveness evaluation questionnaire results were reported by percentages and frequencies of positive responses.

The confidence level considered in the comparative analyses was 95%, the software used was XLSTAT 2023 and MINITAB 14. A detailed description is present in table 7.

Results

The general results of the participants are in the tables below.

Table 5. Parameters generated by Cutometer® Dual MPA 580

Parameter	Definition	Description
R0	Maximum curve amplitude	Highest point of the first curve.
R1	Minimum amplitude	Minimum point of the first curve.
R2	Ua/Uf	Gross elasticity. The closer to one (01), the more elastic the curve.
R3	Last maximum amplitude	-
R4	Last minimum amplitude	-
R5	Ur/Eu	Liquid elasticity. The closer to one (01), the more elastic the curve.
R6	Uv/Eu	Elasticity. The lower the value, the greater the elasticity. Can be related to skin hydration (*8*).
R7	Ur/Uf	Viscoelastic portion compared to the curve. The closer the value is to one (01), the greater the elasticity.
R8	Viscoelastic part	Area above the fixed curve by Uf x Suction time. Lower the value, more elastic the curve.

Table 6. Effectiveness Evaluation Questionnaire

Period	Proposition	Scale
T30 / T60	1. The product improves skin firmness.	1.Totally disagree
	2. The product improves skin elasticity.	2. Disagree
	3. The product provides younger-looking skin.	
	4. The product improves wrinkles and expression lines.	3. Neither agree nor disagree
	5. The product helps combat facial sagging.	4. Agree
	6. The product improves skin general appearance.	
	7. The product helps combat the appearance of lines and wrinkles.	5. Totally agree

Table 7. Detailed Statistical Analysis

Data Types		Statistical Methods	Reported Data	Sample Size
Wrinkle and Fine Line Analysis - VISIA® CR		Descriptive statistics Student's t test to compare T30/T60 vs T0. ANOVA-LSD to compare treatments	Average Average standard error % improvement in average % of participants with improvement p-value	E004121A-01: 21 E004121A-03: 24 E004121A-04: 24
Skin Firmness and Elasticity Analysis - Cutometer® Dual MPA 580	R0			E004121A-01: T0=24 / T30=22 / T60=24 E004121A-03: T0=23 / T30=20 / T60=23 E004121A-04: T0=21 / T30=20 // T60=21
	R5			E004121A-01: T0=24 / T30=22 / T60=24 E004121A-03: T0=23 / T30=20 / T60=23 E004121A-04: T0=22 / T30=21 / T60=22
Effectiveness Evaluation Questionnaire by Study Participants		Descriptive statistics Z test for two proportions	Percentage and frequency of positive responses p-value	E004121A-01: T30=26 / T60=28 E004121A-03: T30=23 / T60=26 E004121A-04: T30=24 / T60=25

Table 8. Investigational Product Participants

Nº of included participants	28	**Nº of participants that finalized the study**	28
Nº of absent participants	0	**Reason**	N/A
Nº of withdrawn participants	0	**Reason**	N/A

Table 9. Benchmark Product Participants

Nº of included participants	28	**Nº of participants that finalized the study**	26
Nº of absent participants	0	**Reason**	N/A
Nº of withdrawn participants	2	**Reason**	Protocol deviation

Table 10. Placebo Participants

Nº of included participants	28	**Nº of participants that finalized the study**	25
Nº of absent participants	3	**Reason**	Personal reasons
Nº of withdrawn participants	0	**Reason**	N/A

Wrinkle and Fine Line Analysis - VISIA® CR Visibility Coefficient Parameter

A significant improvement in the visibility coefficient parameter was observed for product E004121A-01 after 60 days of use, indicating a reduction in wrinkles / fine lines.

No significant difference was observed in the visibility coefficient parameter for E004121A-03 and E004121A-04 (table 11).

No significant difference was observed in the visibility coefficient parameter between treatments after 60 days of use (table 12).

Occupancy Rate Parameter

A significant improvement in the occupancy rate parameter was observed for product E004121A-01 after 60 days of use, indicating a reduction in wrinkles / fine lines. No significant difference was observed in the occupancy rate parameter for E004121A-03 and E004121A-04 (table 13).

No significant difference was observed in the occupancy rate parameter between treatments after 60 days of use (table 14).

Firmness and Elasticity Measurements - Cutometer® Dual MPA 580
Firmness (R0)

A significant improvement in skin firmness was observed for product E004121A-03 after 30 days of use. No significant difference was observed in skin firmness for E004121A-01 and E004121A-04 (table 15).

No significant difference was observed in skin firmness between treatments after 30 and 60 days of use (table 16).

Elasticity (R5)

A significant improvement in skin elasticity was observed for product E004121A-01 after 30 days of use.

Table 11. Descriptive statistics and comparison results – Visibility Coefficient

Treatment	Statistic	T0	T60	T60-T0
E004121A-01	**n**	21	21	21
	Average	3,79	3,55	-0,24
	Standard error	0,41	0,39	0,10
		% improvement (average)		6,3
		% participants with improvement		33,3
		p-value		0,011
E004121A-03	**n**	24	24	24
	Average	4,35	4,24	-0,11
	Standard error	0,53	0,50	0,08
		% improvement (average)		2,5
		% participants with improvement		33,3
		p-value		0,097
E004121A-04	**n**	24	24	24
	Average	4,68	4,64	-0,04
	Standard error	0,42	0,39	0,16
		% improvement (average)		0,9
		% participants with improvement		45,8
		p-value		0,403

Table 12. Result of comparison between treatments – Visibility Coefficient

Comparisons	p-value
E004121A-04 vs E004121A-01	0,252
E004121A-04 vs E004121A-03	0,666
E004121A-03 vs E004121A-01	0,464

Table 13. Descriptive statistics and comparison results –Occupancy Rate

Treatment	Statistic	T0	T60	T60-T0
E004121A-01	n	21	21	21
	Average	0,124	0,118	-0,006
	Standard error	0,009	0,009	0,003
		% improvement (average)		4,8
		% participants with improvement		33,3
		p-value		0,011
E004121A-03	n	24	24	2
	Average	0,129	0,126	-0,003
	Standard error	0,012	0,011	0,003
		% improvement (average)		2,3
		% participants with improvement		33,3
		p-value		0,125
E004121A-04	n	24	24	24
	Average	0,130	0,131	0,001
	Standard error	0,008	0,007	0,004
		% improvement (average)		-0,8
		% participants with improvement		50,0
		p-value		0,586

Table 14. Result of comparison between treatments - Occupancy Rate

Comparisons	p-value
E004121A-04 vs E004121A-01	0,097
E004121A-04 vs E004121A-03	0,360
E004121A-03 vs E004121A-01	0,432

Table 15. Descriptive statistics and comparison results - Firmness (R0)

Treatment	Statistic	T0	T30	T60	T30-T0	T60-T0
E004121A-01	n	24	22	24	22	24
	Average	0,238	0,231	0,232	0,001	-0,006
	Standard error	0,011	0,012	0,011	0,008	0,006
		% improvement (average)			2,9	2,5
		% participants with improvement			54,5	50,0
		p-value			0,531	0,185
E004121A-03	n	23	20	23	20	23
	Average	0,267	0,242	0,263	-0,016	-0,004
	Standard error	0,013	0,013	0,015	0,006	0,011
		% improvement (average)			9,4	1,5
		% participants with improvement			80,0	60,9
		p-value			0,007	0,379
E004121A-04	n	21	20	21	20	21
	Average	0,260	0,257	0,254	-0,008	-0,005
	Standard error	0,015	0,014	0,013	0,007	0,008
		% improvement (average)			1,2	2,3
		% participants with improvement			75,0	71,4
		p-value			0,108	0,253

No significant difference was observed in skin elasticity for E004121A-03 and E004121A-04 (table 17).

A significant improvement in skin elasticity was observed after 60 days of use for E004121A-01 compared to E004121A-04, indicating the superiority of E004121A-01. No significant difference was observed between other treatments (Table 18).

Effectiveness Evaluation Questionnaire

The tables present the participants percentage who reported agreeing (answers with values equal to 4 - Agree and 5 - Totally agree) with the statements evaluated after 30 and 60 days of using the products.

T30

No significant difference was observed between the treatments for all statements evaluated.

T60

No significant difference was observed between the treatments for all statements evaluated.

Table 16. Result of comparison between treatments - Firmness (R0)

Comparisons	p-value	
	T30	T60
E004121A-04 vs E004121A-01	0,328	0,988
E004121A-04 vs E004121A-03	0,416	0,895
E004121A-03 vs E004121A-01	0,073	0,879

Table 17. Descriptive statistics and comparison results - Elasticity (R5)

Treatment	Statistic	T0	T30	T60	T30-T0	T60-T0
E004121A-01	**n**	24	22	24	22	24
	Average	0,434	0,469	0,434	0,027	0,000
	Standard error	0,018	0,018	0,020	0,015	0,015
		% improvement (average)			8,1	0,0
		% participants with improvement			68,2	54,2
		p-value			0,039	0,489
E004121A-03	**n**	23	20	23	20	23
	Average	0,421	0,440	0,385	0,005	-0,036
	Standard error	0,018	0,013	0,014	0,014	0,014
		% improvement (average)			4,5	-8,6
		% participants with improvement			50,0	26,1
		p-value			0,359	0,993
E004121A-04	**n**	22	21	22	21	22
	Average	0,437	0,440	0,390	-0,002	-0,047
	Standard error	0,014	0,018	0,014	0,014	0,014
		% improvement (average)			0,7	-10,8
		% participants with improvement			42,9	36,4
		p-value			0,545	0,998

Table 18. Result of comparison between treatments - Elasticity (R5)

Comparisons	p-value	
	T30	T60
E004121A-04 vs E004121A-01	0,146	0,023
E004121A-04 vs E004121A-03	0,741	0,605
E004121A-03 vs E004121A-01	0,268	0,073

Table 19. Percentages and frequencies of positive responses per treatment – T30

Proposition	E004121A-01	E004121A-03	E004121A-04
1) The product improves skin firmness.	92,3%	87,0%	79,2%
2) The product improves skin elasticity.	88,5%	87,0%	83,3%
3) The product provides younger-looking skin.	88,5%	73,9%	75,0%
4) The product improves wrinkles and expression lines.	80,8%	73,9%	75,0%
5) The product helps combat facial sagging.	92,3%	78,3%	79,2%
6) The product improves skin general appearance.	88,5%	87,0%	83,3%
7) The product helps combat the appearance of lines and wrinkles.	80,8%	73,9%	70,8%

Table 20. Percentages and frequencies of positive responses per treatment -T30

Proposition	E004121A-01 vs E004121A-03	E004121A-01 vs E004121A-04	E004121A-03 vs E004121A-04
1) The product improves skin firmness.	0,541	0,180	0,473
2) The product improves skin elasticity.	0,873	0,603	0,726
3) The product provides younger-looking skin.	0,190	0,214	0,932
4) The product improves wrinkles and expression lines.	0,567	0,623	0,932
5) The product helps combat facial sagging.	0,163	0,180	0,940
6) The product improves skin general appearance.	0,873	0,603	0,726
7) The product helps combat the appearance of lines and wrinkles.	0,567	0,411	0,813

Table 21. Percentages and frequencies of positive responses per treatment – T60

Proposition	E004121A-01	E004121A-03	E004121A-04
1) The product improves skin firmness.	96,4%	92,3%	80,0%
2) The product improves skin elasticity.	92,9%	92,3%	80,0%
3) The product provides younger-looking skin.	85,7%	84,6%	76,0%
4) The product improves wrinkles and expression lines.	92,9%	84,6%	80,0%
5) The product helps combat facial sagging.	89,3%	92,3%	76,0%
6) The product improves skin general appearance.	96,4%	92,3%	84,0%
7) The product helps combat the appearance of lines and wrinkles.	85,7%	88,5%	76,0%

Table 22. Percentages and frequencies of positive responses per treatment – T60

Proposition	E004121A-01 vs E004121A-03	E004121A-01 vs E004121A-04	E004121A-03 vs E004121A-04
1) The product improves skin firmness.	0,513	0,060	0,198
2) The product improves skin elasticity.	0,939	0,170	0,198
3) The product provides younger-looking skin.	0,910	0,369	0,437
4) The product improves wrinkles and expression lines.	0,337	0,170	0,666
5) The product helps combat facial sagging.	0,700	0,199	0,103
6) The product improves skin general appearance.	0,513	0,126	0,356
7) The product helps combat the appearance of lines and wrinkles.	0,763	0,369	0,239

Discussion

Recently, dietary supplements industries have sought to offer products with proven quality and efficacy through clinical studies and claims determinations (9). Hydrolyzed collagen is also included in this need for studies, aiming to prove its effects in relation to skin health, improving firmness, elasticity, wrinkles, expressions lines, sagging and youthfulness (7).

The study compares the efficacy of GelcoPEP Beauty product with the benchmark product with placebo control, for the skin health maintenance claim. Based on the study results of products E004121A-01, E004121A-03 and E004121A-04, is possible to verify that, for the visibility coefficient parameter, E004121A-01 showed a significant improvement. For the products E004121A-03 and E004121A-04, no difference was observed. The same occurred for the occupancy rate parameter.

For the measurements with Cutometer® Dual MPA 580, there was a significant improvement in R0 for E004121A-03, after 30 days of use. For E004121A-01 and E004121A-04, no significant difference was observed. However, no significant difference was observed in skin firmness through instrumental measurements between treatments, indicating that the investigational product, the benchmark product, and the placebo showed similar efficacy.

For R5, a significant improvement was observed after 30 days of use for E004121A-01. No significant improvement was observed for E004121A-03 and E004121A-04. After 60 days, a significant improvement was observed for E004121A-01 compared to E004121A-04, indicating the investigational product superiority over the placebo. No difference was observed between the other treatments, indicating that the investigational product has similar effect to the benchmark product.

For effectiveness evaluation questionnaire, no significant differences were observed between the treatments for all the statements evaluated.

The results presented in this study reinforce the results obtained in previous studies, which, in general, obtained results that the use of hydrolyzed collage provides an improvement in the appearance of the skin. With the tests conducted, it was possible to demonstrate that GelcoPEP Beauty hydrolyzed collagen provides improvements in firmness factors, the presence of fine lines, wrinkles and, especially, skin elasticity (6,12).

The limitation of the study was the placebo effect that occurred during the participants' answers to the questionnaires. Placebo effect can be defined as a phenomenon in which a person notices improvements in their health status after receiving a treatment that does not have the functionality to improve the patient's condition. Thus, the placebo effect may have interfered in the answers to the questionnaires, intervening in the evaluation of the collected results (5).

Conclusion

The use of GelcoPEP Beauty demonstrated positive effects in terms of maintaining skin health, such as improving wrinkles, fine lines, firmness and, mainly, skin elasticity, with similar effect to the benchmark product available on the market.

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Incidence of positive troponin test in patients with clinical suspicion of ACS without significant ECG changes

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Abstract

Abstract: Elevated troponin levels on a high-sensitivity cardiac troponin test indicate heart muscle damage or a heart attack. The normal value for a high-sensitivity cardiac troponin T test is 14 ng/L. Therefore, when a high-sensitivity cardiac troponin T test detects levels above 14 ng/L, heart damage or a heart attack is likely.

Objectives: The aim of this study was to examine troponin testing patterns at the Emergency Medicine Clinic of the University Clinical Hospital in Sarajevo for the months of October and November 2024 and to determine the impact of elevated values on further hospital treatment of the patient.

Methods: This retrospective study analyzed the medical records of all adult patients who underwent troponin testing at the Emergency Medicine Clinic of the University Clinical Hospital in Sarajevo during the months of October and November 2024. Patients who had ST-elevation myocardial infarction were excluded from the study.

Results: A total of 4000 patients were at the Emergency Medicine Clinic in the internal medicine ambulance in October and November, of which troponin tests were ordered for 246 (6.5%) patients. The majority of patients had negative troponin test results 3754 (93.85%).

Chest pain, palpitations, and shortness of breath were the most common complaints in those with positive troponin results.

Overall, only 28.2% of those with positive troponin test results had a definitive diagnosis related to heart disease, such as heart failure, acute coronary syndrome (ACS), atrial fibrillation, or other types of arrhythmia.

Conclusion: A positive troponin test was associated with increased hospitalizations, however, only a small proportion of these patients had a definitive diagnosis related to heart disease. Guidelines should be provided to ensure that troponin testing is performed only in cases where ACS is suspected.

Key words: *troponin test, acute coronary syndrome, heart diseases*

Introduction

Chest pain is one of the most common reasons for emergency department visits. Because there are many causes of chest pain, the emergency room physician has a responsibility to rule out potentially dangerous and serious conditions, such as myocardial infarction, aortic dissection, or pulmonary embolism. Necessary diagnostic tests include a detailed patient history and physical examination, chest X-ray, 12-lead electrocardiography (ECG), and blood tests for biomarkers of myocardial injury. Of these, the most widely used and validated biomarkers for detecting cardiac cellular injury are cardiac high-sensitivity troponins T and I (cTn-I) because they have high sensitivity and specificity for myocardial injury.

The troponin (T-test) is performed at the KCUS Emergency Medicine Clinic. The normal value for the high-sensitivity cardiac troponin T test (hs-cTnT) is up to 14 ng/L. However, because the troponin test is very sensitive, an inevitable number of false-positive results can be expected. Since the main reason for cardiac troponin testing is to rule out acute coronary syndrome (ACS), it is essential that troponin is checked only in circumstances where ischemic heart disease is highly likely and ACS is suspected. This study therefore aimed to review troponin testing patterns among patients presenting to the Emergency Medicine Clinic and to examine whether elevated troponin test values correlate with further hospital treatment.

Methods

This retrospective study included all patients aged ≥18 years who underwent troponin testing after admission to the Emergency Medicine Clinic in October and November 2024. Patients who had ST-elevation MI (STEMI) were excluded. Patient data were collected from the hospital's electronic medical records. Troponin levels were considered positive at ≥14 ng/L and negative at <14 ng/L. Patients' presenting complaints were classified as cardiac or non-cardiac, with cardiac complaints including chest pain, palpitations, shortness of breath, and epigastric pain. Epigastric pain was included as a cardiac symptom because it is potentially indicative of an atypical presentation of angina.

Each patient's final diagnosis was categorized as cardiac or noncardiac, with cardiac diagnoses including heart failure, ACS, atrial fibrillation, or other forms of arrhythmia.

Results

During the research period, a total of 4,000 patients were examined in the internist clinic of the KUM. Of these, 246 adult patients underwent cTnT testing. Patients who had confirmed STEMI on ECG were excluded from the analysis. The average age of the patients was 56.6 ± 16.7 years.

A total of 246 patients (6.15%) had cardiac symptoms. In relation to gender, 132 (53.3%) patients were men and 114 (46.7%) patients were women. Of these, chest pain was the most common, followed by shortness of breath, epigastric pain and palpitations. Interestingly, a large proportion of patients (n = 3754; 93.85%) did not have any cardiac symptoms. Overall, only 65 (26.0%) of those with cardiac symptoms had initial positive troponin test results.

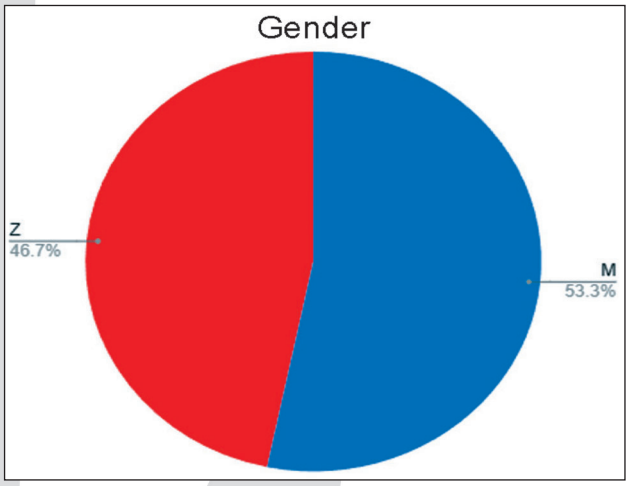

Figure 1. Presentation of patients in relation to age and gender

Regarding treatment, 212 patients (86.1%) did not have a repeated troponin test, and 34 (13.9%) underwent at least one repeated troponin test.

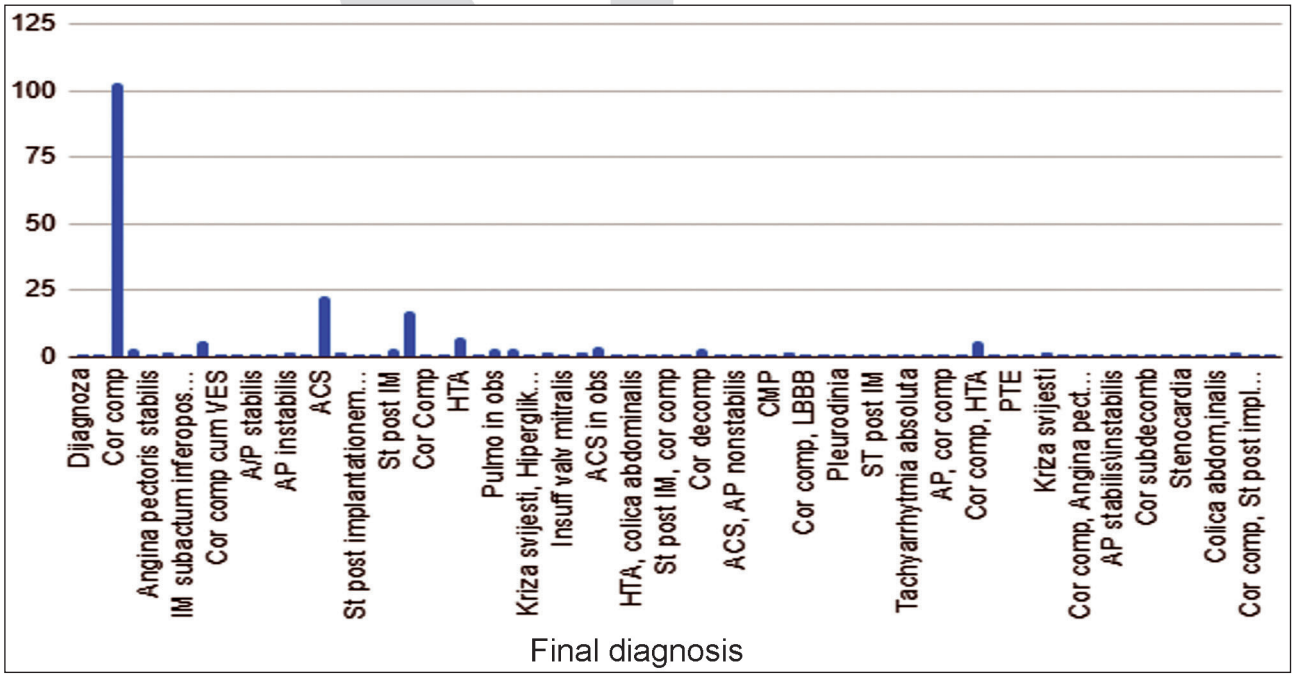

Figure 2. Presentation of patients with the result of the tropnin test in relation to the final diagnosis

Only 30 (12.0%) patients with a positive troponin test were referred to a cardiologist, i.e. 10 (9.1%) patients underwent ACS treatment.

A total of 97 patients (39.5%) had a final diagnosis related to heart disease, of which 36 patients (15.1%) had positive troponin tests, as shown in Figure 2. Patients were referred for further hospital treatment under different diagnoses, the most common of which was ACS.

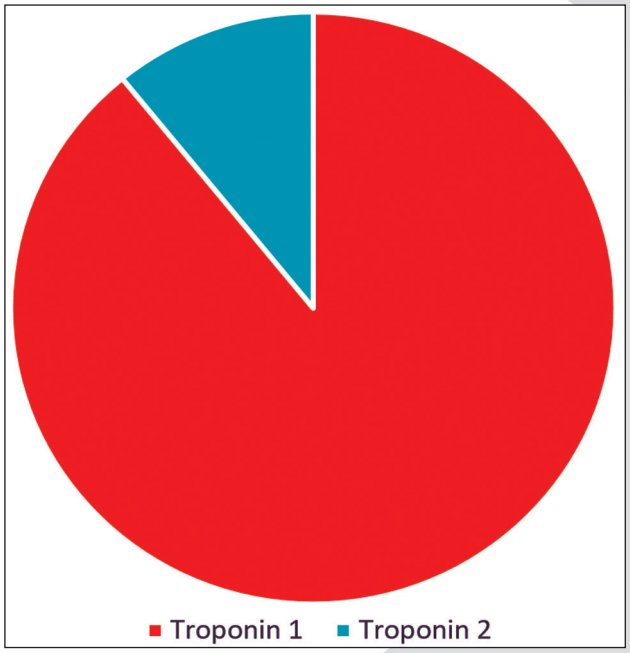

Figure 3. Positive troponin findings (n = 30) Negative troponin findings (n = 216)

Discussion

Although the results showed that cardiac troponin testing was performed mainly for patients with chest pain or in cases where ACS was suspected, it was also occasionally requested for patients with non-cardiac symptoms. It is possible that the attending physician in those cases requested troponin testing because he believed that the patient's presentation could be the result of an atypical manifestation of ACS.

Although troponin tests are widely available, not all hospitals have clear guidelines or protocols on when to request a troponin test, which may inadvertently lead to inappropriate use of this diagnostic test.

Although troponin tests are mainly used to diagnose ACS, troponin levels can also be elevated in other cardiac conditions such as heart failure, tachyarrhythmias and post-cardiac arrest as well as non-cardiac conditions such as cerebrovascular insults, head injuries, sepsis and pulmonary embolism.

In these circumstances, a troponin test should only be performed if there is a strong suspicion of ACS - such as previous chest pain or ECG changes - since a positive result can be misleading.

Interestingly, although 97 patients in the current study had final cardiac-related diagnoses, only eight of these patients (8.2%) had a diagnosis of ACS.

As expected, patients with positive troponin test results in this study had a significantly longer hospital stay than those with negative findings.

These patients were also significantly more likely to be treated for ACS, referred to a cardiologist, and underwent angiography.

However, only 13.8% of patients with positive troponin findings were referred to cardiologists; it is likely that the remaining 86.2% of patients were not considered to have significant heart disease and were therefore not referred. In these cases, it is unclear why a troponin test was requested if such patients were not subsequently referred to a cardiologist despite elevated troponin levels.

If ACS is suspected and the initial troponin test result is negative, it is recommended that the test be repeated within six hours to completely rule out MI and improve diagnostic accuracy.

However, in the current sample, only a small number of patients underwent a second test, and this proportion was even smaller among those with an initial negative result.

Overall, the results of the current study confirm the results of similar studies conducted in other parts of the world. Such findings highlight the need for appropriate emergency department guidelines and protocols for requesting troponin testing. For economic reasons, it is prudent to limit such requests for unnecessary tests, thereby reducing unnecessary hospital stays and admissions.

This study was subject to certain limitations due to its retrospective nature and the method of data collection using patient records and a hospital information system (BIS). Final cardiac diagnoses were not subcategorized by specific condition as this was beyond the scope of this study; the focus of the analysis was to determine the pattern of requests for cTn-I testing rather than to study the prevalence of individual cardiac conditions.

Conclusion

In the current study, it was shown that a large number of patients visiting the Emergency Department underwent troponin testing despite not having cardiac symptoms. Only a small proportion of patients with initial positive troponin test results received a definitive cardiac-related diagnosis after discharge. Such unnecessary testing may lead to prolonged patient stays and unnecessary referral to the cardiology department. Therefore, hospital protocols regarding the appropriate use of troponin testing are needed to guide emergency physicians for triage.

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Is there an answer to the late diagnosis of hemorrhoidal disease?

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Abstract

Hemorrhoid disease is a great social and medical problem because of frequency. Over 80% of the population have a problem with hemorrhoids, that in the most of cases need surgery treatment. In hemorrhoid therapy, surgery, recently, has attacked on the manifest of complications-widen hemorrhoidal plexus, that consisted of their reduction. In addition, the cause of disease has stayed intact. Because of it, the number of received illnesses was very high. The latest methods of treatment based on clearing the cause of disease. They understood Doppler's identification of blood vessel and its ligature, hemorrhoid suspension and prolapsed anal mucosa with reconstruction and rectoanal reparation. The aim of the study is to show the results of treatment of hemorrhoid disease by minimal invasive procedure known as DG HAL RAR (Doppler identification I ligature of the terminal branches of the hemorrhoid artery and rectoanal reparation), the advantages of that way of treatment to respond to standard, earlier methods.

The Board of Health 'ALEA' conducted examinations on 2,160 patients for minimally invasive procedures utilizing our own THD and DG HAL methods from 2023 to 2024. By the way, in 16 (0,7 %) patients in I phase of the disease, received DG HAL. The 93 (4,30 %) in II, the The III stage 1016 (47,03 %), belonged to IV phase of disease 1035 (47,85 % of IV grade, by whose applied minimal invasion procedure-DG HAL RAR. End other methods anocutaneoneoplastique with rectoanal reparation. Number of 1720 (80,0 %) patient is followed by one of the disease in the sense of fissure, fistula, polypus, hypertrophied anal papilla and two anal pectenosis. In 58 (2,79 %) patient was found, the malignant disease of anal canal, and 69 (3,19 %) patient of rectum.

The average length of treatment was 1,6 b/o days. Surgery controls done after 6,10, 30 days, and 2, 4, 6 and 12 months. All the patients who received only DG HAL RAR showed the excellent results, by satisfying degree of surgeons and patients.

In 12 patients who received only DG HAL after 6 months, the procedure was repeated, with DG HAL RAR method after results were great.

No postoperative complications, such as infection or disfunction of the anal sphincter, were registered. In operated patients who received DG HAL RAR, insignificant postoperative pains gone in the period of 4-6 hours.

All patients receiving DG HAL were treated without local anesthesia, and those receiving DG HAL RAR underwent spinal or general anesthesia.

Minimally invasive methods of treatment DG HAL RAR present the most effective methods of hemorrhoid treatment. The impact of treatment on its utilization. They accomplish all terms for 'one day' surgery.

Key words: *hemoroid, minimal invasion procedure, DG HAL RAR.*

Rezime

Uvod i značaj: Hemoroidalna bolest zbog svoje učestalosti, poteskoća u liječenju predstavlja ogroman socijalni i medicinski problem. Preko 80 % stanovništva boluje od hemoroida, koji u najvećem broju slučajeva zahtjevaju hirurško liječenje.

Hirurgija je u liječenju hemoroida, doskora atakovala na proširenu hemoroidalni pleksus, koje se sastojalo u njegovom ligiranju ili redukciji. Najveći dio hemoroida iznad atakovanog mjesta ostajao je intaktan. Broj recidiva bolesti i drugih komplikacija bio je izrazito visok.

Manifestuju se u četiri stadija oboljenja. Brojne su kontroverze u određivanju stadija hemoroidalne bolesti. Dijagnostičke dileme stvaraju preduslove da bolesnik uđe u zakašnjeli stadij oboljenja u kom je izložen dugotrajnim patnjama, a i liječenje je izuzetno teško.

Najnovije metode liječenja se zasnivaju na rješavanju uzroka bolesti doplerskom identifi-

kacijom krvnog suda koji učestvuje u stvaranju hemoroida, njegovoj ligaturi i suspenziji hemoroida i prolabirane analne mukoze.

Cilj rada je da se iznesu rezultati liječenja hemoroidalne bolesti minimalno invazivnim post-up-kom poznatim kao DG HAL RAR (doplerska identifikacija i ligature terminalnih grana hemoroidalnih arterija i rektoanalna reparacija), da se iznesu prednosti toga načina liječenja u odnosu na standardne, ranije metode što je i odgovor na postavljeno pitanje u rješavanju ove bolesti.

U desetogodišnjem periodu /2013. do 2023. godine/, u Zdravstvenoj ustanovi "Alea" analizirano je 2.160 bolesnika koji su liječeni minimalno invazivnim primjenjenim postupkom - DG HAL RAR.

U prvom stadiju hemoroidalane bolesti bilo je 16 (0,7 %), u drugom 93 (4,30 %, u trećem 1.016 (47,03 %), a u četvrtom stadijumu oboljenja 1.035 (48,0 %). Pritom, u IVa stadiju 512 (23,70 %), a u IVb 472 (21,8 %).

Dijagnoza je postavljena na osnovu anamneze, kliničkog i endoskopskog pregleda. Pritom, anoskopija ima veliki dijagnostički značaj. Digotorektalni pregled sa **aktom stezanja** predstavlja najveći dijagnostički parametar u interpretaciji funkcije analnog sfinkternog mehanizma.

Od ukupno 2.160 posmatranih ispitanika, kod 16 (0,74 %) bolesnika primjenjen je DG HAL; DG HLA RAR kod 1.109 (51.32 %), a kod 1.035 (47,91 %) DG HAL RAR sa kompleksniom reparativnim anokutanoplastikama. Metoda HAL-RAR, dala je odlične rezultate liječenja.

Hemoroidalnu bolest kod 1.720 (79,6 %) pratilo je jedno od oboljenja u smislu fisura, gnojnih perianalnih procesa, fistula, polipa, analne pektenoze kao i smetnje u analnoj pasaži stolice. Hipertrofični analni papilitis imao je učešća u 1.158 (53,61 %), a kod 127 (5,6 %) nađena je maligna bolest anorektuma.

Prosječna dužina liječenja iznosila je 1,6 b/o dana. Hirurške kontrole su vršene nakon 6, 14, 30 dana, te 3, 6, 12 i 24 mjeseca.

Od 16 (0,7 %) bolesnika kod kojih je urađen **DG HAL**, recidiv je nastao kod 13 (81,25 %), u kratkom vremenskom periodu poslije operacije. Evaluacijom rezultata liječenja 99 bolesnika DG HAL metodom operiranih u drugim ustanova, svi su razvili recidiv ubrzo nakon operacije. Smatramo da samo DG HAL bez dodatnih postupaka u smislu DG HAL + RAR nema indikacija u liječenju hemoridalnog oboljenja, jer ne rješava uzroke bolesti.

DG HAL+ RAR metoda, daje odlične rezultate liječenja. Kod 1.109 (51,3 %) operisanih ovom metodom nije bilo recidiva u posmatranom periodu. Ranih i kasnih postoperativnih komplikacija nije registrovano. Zadovoljstvo hirurga i bolesnika je izuzetno veliko.

Minimalno invazivna metoda liječenja DG HAL - RAR predstavlja do sada najefektivniju metodu liječenja hemoroidalne bolesti. Siguran efekat izliječenja, brz oporavak i brzo vraćanje na posao opravdavaju njenu primjenu.

Metoda DG HAL RAR sa brojnim rekonstruktivnim postupcima primjenjena je kod 1.035 (48,0 %) operiranih bolesnika IV stadija, takođe sa odličnim rezultatima liječenja.

Na sveukupno istraživanom materijalu, ranih poslijeoperativnih komplikacija, kao krvarenje registrovali smo kod 4 (0,2 %) bolesnika. Od kasnih postoperativnih komplikacija, recidiva, smetnje sa kontinencijom nismo imali. Infekcija i smrtnih slučajeva nije bilo.

***Ključne riječi**: hemoroidi, minimalno invazivni postupak - DG HAL-RAR, reparativni postupci.*

Uvod i značaj

Hemoroidi kao simptom hemoroidalne bolesti predstavljaju varikozno proširenje venskih hemoroidalnih plexusa. Preko 90 % stanovništva boluje od hemoroidalne bolesti, od kojih 80 % zahtjevaju operativno liječenje. Skoro podjednako je zastupljena kod osoba oba spola.

Najstariji zapisi grčkih, arapskih, indijskih i drugih autora govore o ovoj bolesti, načinu lječenja.

Manifestuju se kao unutrašnji i vanjski hemoroidi, u četiri stadijuma oboljenja.

Osnovni znaci bolesti su bol, svrbez, pečenje, prolaps, krvarenje sa sekundarnom anemijom.

Pritom, akutni znaci su tromboza, krvarenje, uklještenje, infekcije.

Kasne komplikacije su pruritus, prolaps, perianalni kožni nabori, upalni procesi, sekundarne anemije, maligne alteracije, bolovi u karlici, neurastenija, depresija, proljevi, opstipacija...

Konzervativna terapija ima za cilj da ublaži simptome bolesti primjenom adstringentnih masti,

čepića i načinom ishrane. Samo nedovoljno educirani "stručnjaci " liječe do iznemoglosti hemoroidalnu bolest "mastima i čepićima" uvodeći bolesnike u nesnosno i nepopravljivo stanje!

Doskorašnje operativno liječenje hemoroidalne bolesti sastojalo se u eksciziji distalnog dijela hemoroidalnog, prolabiranog proširenja, dok najveći dio hemoroida ostajao netaknut (Morgan-Milligan, Baron ligaturi, Parks i drugi). Pritom, ekscizija „plemenite zone detekcije" stolice i vjetrova koja se nalazi na hemoroidalnom čvoru - koji se „reže", rezultira poremećajima u kontroli stolice i vjetrova. Preostali hemoroidi iznad mjesta ataka razlog su nastanku recidiva u kratkom periodu nakon operacije. Defekt na analnom kanalu nakon ekscizije hemoroida, ostaje nezaštićen kožom, sa posljedičnim teškim stenozama čmarnog kanala drugim brojnim komplikacijama.

Operacija po Withead uz eksciziju distalnog dijela hemoroidalanog čvora ide sa naknadnim šivanjem nastalog defekta. Ova metoda, kao i prethodne, ostavlja najveći dio hemorida intaktnim, što se, takođe, daje brzi recidiv.

Baron ligatura, elektrokauterizacija, kriohirurgija, fotokoagulacija imaju historijski značaj.

Pomenute metode ne rješavaju uzrok, nego posljedice hemoroidalne bolesti. Praćene su dugotrajnim poslijeoperativnim bolovima, produženom rehabiltacijom i dugim bolovanjima. Posebnost je visok procenat recidiva u kratkom roku nakon operacije sa još težim smetnjama, što je učinilo da bolesnici bježe od operacije. Stenoza analnog kanala se razvija izuzetno brzo nakon tih operacija. Kod stenoze, pri defekaciji dolazi do „pucanja" analnog kanala uz jake, progresivno pojačavajuće, neizdržive bolove sa čestim poremećajima kontinencije.

U osnovi, ekscizija prolabiranog hemoroidalnog proširenja, ostavlja najveći dio hemoroida intaktnim, što se ispoljava recidivom. Istovremeno, nakon ekscizije ostavljaju analni kanal „golim" što potencira njegovu fibrozu i dalje suženje sa teškim posljedicama.

Minimalno invazivne metode liječenja hemorida

Pronalaskom ultrazvuka, doplera krvnih sudova rađa se nova era uzročnog liječenja hemoroidalne bolesti. THD, DG HAL - RAR (Doppler Guide Ligation Hemorrhoidal Artery – rectoanal reparation) datira od 1992. godine. Zasniva se na doplerskoj identifikaciji krvnih sudova koji su doveli do nastanka hemoroida, njihovoj ligaturi, suspenziji i fiksaciji za slojeve crijevne stijenke, čime se etiološki rješava bolest. Nema „sječenja" i „rezanja" internih hemoroida, čuva se zona detekcije stolice i vjetrova, a oštećeni analni kanal se zbrine metodama rektoanalnih reparatornih postupaka.

Metoda spada u najnoviji trend hirurgije, poznata kao minimalno invazivni hirurški postupak kojim se najmanjim atakom na organizam postižu odlični rezultati.

Zapušteni hemoroidi predstavljaju kompleksan medicinski problem čije hirurško rješavanje zahtjeva veliku stručnost i izuzetnu keativnost hirurga proktologa, pogotovu u našoj kazuistici zbog zakašnjelog javljanja na liječenje.

Cilj rada

Cilj rada je da se iznesu: - razultati hirurškog liječenja hemoroidalne bolesti, primjenom minimalno invazivnih hirurskih postupaka zasnovanim na doplerskoj identifikaciji krvnog suda i njegovoj ligaturi, te rektoanalnoj reparaciji, poznatoj kao DG HAL – RAR;

- da se naznače striktne indikacije i prednosti te metode, u odnosu na ranije konvencionalne metode liječenja hemoroidalne bolesti.
- Posebnost je da se ukaže na kompleksnost u dijagnostici i tretmanu svakog stadija bolesti čije dosadašnje određivanje ne odgovara stanju bolesti u kome se bolesnik nalazi.
- da se ukaže na potrebu liječenja hemoroida prije stadija komplikacija.
- da se ukaže da je hemoroidalni prolaps sa posljedičnom prokcidencijom uzrokovan hemoroidalnom bolešću u njenom terminalnom stanju.

Materijal i metode rada

Istraživanje je izvršeno retrospektivnom analizom i prospektivnim praćenjem bolesnika koji su hirurški liječeni u Zdravstvenoj ustanovi "Alea dr Kandić" u Sarajevu, u periodu 2013.-2023. godine. Pritom, analizirano je 2.160 bolesnika koji su operirani minimalno invazivnim postupcima

zasnovanim na doplerskoj identifikaciji hemoroidalnih krvnih sudova, metodom THD DG HAL; THD DG HAL-RAR sa kompleksnim rektoanalnim reparativnim postupcima.

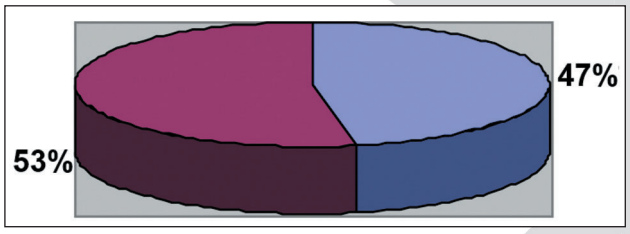
Bolesnici su prospektivno praćeni u periodu do deset godina poslije operacije u smislu evaluacije efekata primjenjene metode: poslijeoperativne boli, vremena potrebnog za oporavak i vraćanja na posao, funkcije kontinencije, lokalnog nalaza, ekonomskih efekata, recidiva bolesti, te bolesnikovog i hirurgovog zadovoljstva aktom operacije.

Rezultati istrazivanja i diskusija

U kazuistici zdravstvene ustanove "Alea dr Kandić", u desetogodišnjem periodu (2013.- 2023. godine) analizirana su 2.160 ispitanika koji su liječeni zbog hemoroidalne bolesti (H.B u daljem tekstu) primjenom minimalno invazivnih postupaka - DG HAL; DG HAL – RAR i DG HAL - RAR sa rektoanalnim reparatornim postupcima. Poseban akcenat je stavljen na hirurško rješavanje zakašnjelih stadija hemoroidalne bolesti.

Kretanje bolesti u odnosu na spol

Muški spol je imao učešće kod 1.015 (47,0 %), ženski 1.145 (53,0 %), što ne govori o značajnoj razlici u pogledu spolne zastupljenosti oboljelih. Slične podatke iznose i drugi autori (1, 3, 6, 7, 8, 9…).



Grafikon 1. Spolna zastupljenost i uzrast bolesnika od hemoroidalne bolesti ()

Kretanje bolesti u odnosu na uzrast bolesnika

Najmlađi bolesnik je imao 9, a najstariji 78 godina. Prosječna dob bolesnika iznosila je 44 godine. Podaci drugih autora pokazuju sličnu prosječnu dobnu zastupljenost oboljenja (3,5,6,7).

Tabela 1. Uzrast bolesnika

Dob bolesnika	Broj	% odnos
7- 19	190	8,
20-50	1.118	51,8
Iznad 50	984	45,55
Ukupno	**2.259**	**100,00**

U dobi od 20-50 godina bilo je 1.018 (47,1 %), a iznad 50 godine 952 (44,0 %), što govori da uzrast sa pojačanim aktivnostima i slabljenjem fibromuskularnih struktura tkiva, uz ostale faktore (zanimanje, nasleđe, brojna oboljenja...), pogoduju nastanku hemoroida. Do 19 godine, imali smo 190 (8,8%) bolesnika (Tabela 1). Značajan broj oboljelih pripadao je mlađim dobnim uzrastima, pri čemu je nasljedni faktor nastanka hemoroidalne bolesti bio odlučujući. Slične podatke iznose brojni autori (2,6,7,8).

Stadijum hemoroidalne bolesti

Najveći broj ispitanika (Tabela 2), pripadao je trećem stadiju uznapredovale bolesti - 1.016 (47,03 %), potom, četvrtom 1.035 (47,9 %), drugom 93 (4,3 %), i prvom stadiju 16 (0,7) što ilustrativno govori da nam se najveći broj oboljelih javlja u stadijumu komplikacija bolesti.

Registrovali smo 3 bolesnika uzrasta do 10 godina, što ide u prilog da ni najmlađa dobna uzrast nije poštođena od ove bolesti. U dva slučaja radilo se i o hemoroidalnoj bolesti, (dva brata 8 i 11 godina) i jednom hemoroidorektoanalnom prolapsu.

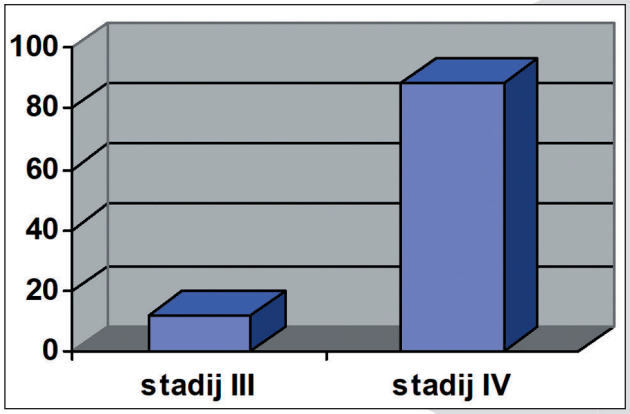
Brojne predrasude o bolestima analne regije, stid i izbjegavanje digitorektalnog pregleda i drugih dijagnostičkih metoda imaju presudan uticaj. Paramedicinska aktivnost, primjena brojnih trava i ljekova od nadriljekara, takođe, imaju veliki značaj u čemu se slažu brojni autori (2,4,6,7)

Tabela 2. Stadijum hemoroidalne bolesti

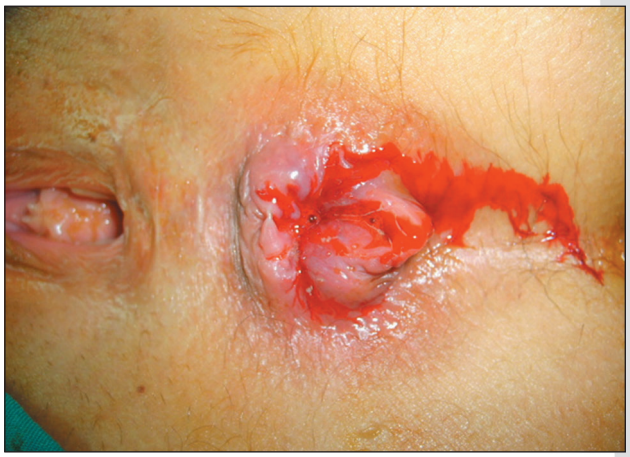
Stadijum hemoroidalne bolesti	Broj oboljelih	% odnos
I stage	16	0,7
II stage	93	4,3
III stage	1.016	51,6
IV stage	1.035	47,9
Ukupno	**2.160**	**100,00**

Kako se vidi iz tabele 2, najveći broj oboljelih se javlja u zakašnjelom stadiju bolesti kada, bolesnik, više nema izbora.

Nedovoljna edukacija medicinskog kadra u ovom domenu predstavlja poseban problem. Naime, znatan broj ljekara, pa i gastoenterologa ne želi suočavanja sa ovim problemom, pa često i bez pregleda prepiše „masti i čepiće".



Grafikon 2. Broj oboljelih

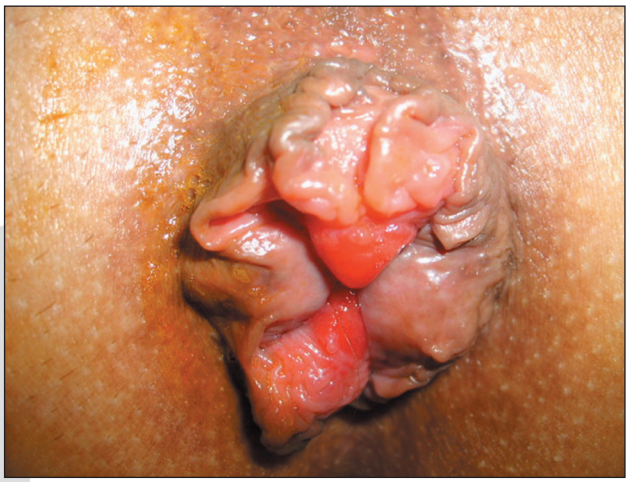


Slika 1. III a stadijum H. B.

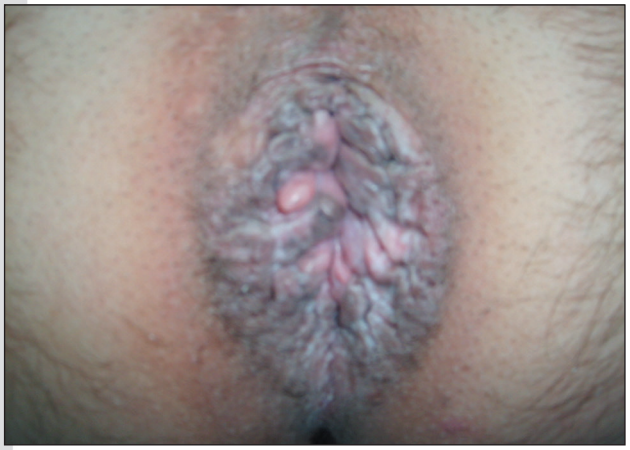
Upravo, komplikacije III i IV stadija hemoroidalne bolesti: krvarenje, uporni bolovi, protruzija, prolaps analne mukoze, trombotičke i inflamatorne manifestacije, inkarceracije, smetnje sa evakuacijom stolice natjerale su bolesnike da zatraže pomoć liječnika.

Dužina oboljenja prije operacije kretala se od osam do 45 godina (prosjek 32 godina).

Nepoznavanje problematike hemoroidalne bolesti, indikacija za liječenje iste, ovisno od stadijuma bolesti, od strane mnogih "dijagnostičara" razlog je da se pacijenti u našoj kaziistici javljaju u zakašnjelom stadijumu, to jest, u stadijumu komplikacija. Slične podatke iznose brojni autori (1, 2, 3, 6, 7, 8).



Slika 2. IV b stadijum h.b.



Slika 3. Stanje nakon elektrokauterizacije

Tabela 3. Kretanje HB u odnosu na zanimanje

Zanimanje i H.B	Broj	% odnos
Namjesnika	814	36,03
Vozača	717	33,2
Ostalih	629	27,8
Ukupno	**2.160**	**100,00**

Kako se iz prethodne tabele vidi, H.B. je najčešće bila zastupljena kod namjesnika čije je zanimanje vezano za sjedeće zanimanje, kod vozača i težih fizičkih radnika. Oboljenje kod bliskih srodnika registrovali smo kod 856 (39,6 %) ispitanika što govori o značaju nasljednog faktora u nastanku hemoroidalne bolesti. Slične podatke iznose i drugi autori (1, 3, 6,7).

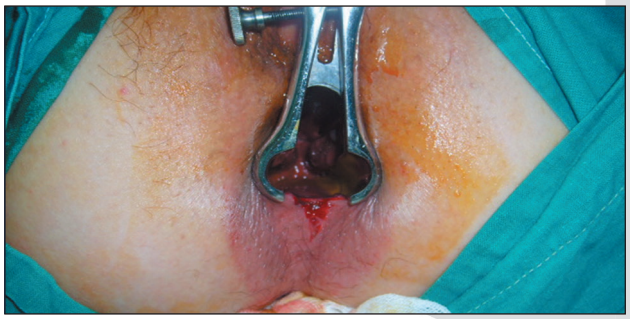
Dijagnoza je postavljena na osnovu anamneze, kliničkog pregleda i endoskopskog nalaza.

Tabela 4. Hemoroidalna bolest - udružena sa drugim oboljenjima

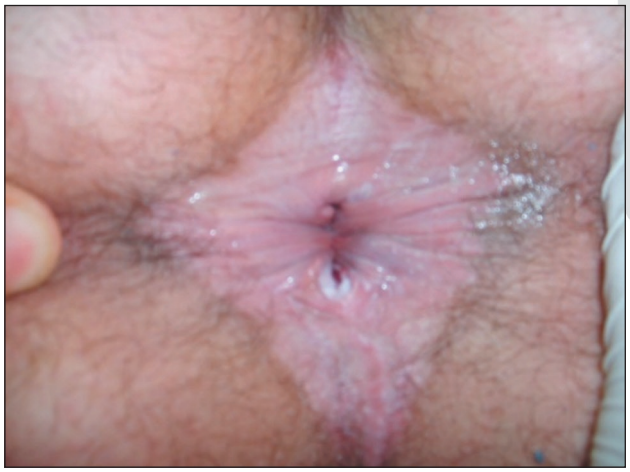
Bazična bolest	Udružena sa	Broj	% Odnos
Hemoroidi	Fissure, ragade	1.830	87,7
Hemoroidi	Analna fistula	428	18,9
Hemoroidi	Analni papilitis-hipertroficni	1.760	81,4
Hemoroidi	Neoplazma anorektuma	127	5,9
Hemooroidi +	HPV+	164	7,6

Na istraživanom materijalu (Tabela 4), analnih fisura/ragada sa hemoroidima je bilo 1.830 (87,7%), analnih fistula 428 (18,9%). Analni papilitis, pratio je 1.760 (81,4 %) oboljelih koji je uzrok su stalne nalagodnosti, upornih bolova i asocijalizacije oboljelih. Bilo je 164 (7,69 %) HPV pozitivnih (bris ili tkivni PHD nalaz preparata).

Znači, hemoridalna bolest je najčešće zastupljena sa brojnim drugim oboljenjima (3,5,7,10, 12) koje se manifestuju kao komplikacije istog. Operativno nezbrinut analni papilitis ili postoperativno nastao papilitis je uzrok poslijeoperativnog bola i nezadovoljstva bolesnika. Malignu bolest anorektuma pratilo je 127 (5,9 %) spitanika. Slične podatke iznose mnogi autori (3, 5, 7, 12).



Slika 4. Analna fisura



Slika 5. Analna striktura i fisura nakon laserske operacije

Tabela 5. Simptomatologija hemoridalne bolesti

Simptomatologija bolesti	Broj	% odnos
Promjene u navikama pražnjenja crijeva	1.890	87,5
Hemoroidalni prolaps	885	41,0
Krvarenje – bol – prolaps	1.036	48,0
Krvarenje – prolaps	1.442	53,0
Krvarenje – bol	1. 663	76,9
Znaci anemije, hipoferemije	564	26,1
Hemoroidi sa HPV i nfekcijom (bris ili tkivni preparat)	164	7,6

Najveći broj bolesnika (Tabela 5) javlja nam se u zakašnjelom stadijumu bolesti, u stadijumu komplikacija. Pritom, promjena u navikama pražnjenja crijeva bilo je kod 1.890 (87,5 %), hemoroidalni prolaps imalo je 885 (41,0 %), prolaps sa krvarenjem i bolovima 1.036 (48,0 %), prolaps sa krvarenjem kod 1.442 (53,0 %). Znaci anemije i hipoferemije pratili su 640 (26,1 %) oboljelih. Razlozi ovakvog stanja su nedostatak adekvatno educiranog medicinskog kadra i stanovništva u domenu ove bolesti, koje vodi ovu bolest u stadij komplikacija. Pritom izbjegavanje digitorektalnog pregleda (stigma) analne regije predstavlja problem koji traži rješenje. Slične podatke iznose brojni autori (2,4,5,7,8).

Hpv infekcija je registrovana kod 164 (7,6 %) oboljelih. Broj takvih bolesnika je u porastu.

U osnovi, pacijenti se javljaju u momentu kada ih prolaps, krvarenje, anemija tromboza ili infekcija natjeraju hirurgu. Istovremeno, dugotrajna primjena brojnih, prethodnih alternativnih paramedicinskih postupaka, samostalno indicirana od bolesnika ili od „stručnjaka“ vodi bolest u stadijum komplikacija

Anamnestički podaci, klinička slika, inspekcija analne regije (dermatitisi, egzema, prolaps...), potom, endoskopski, laboratorijski nalazi su protokol dijagnoze hemoroidalne bolesti (Tabela 6).

Značaj **anoskopije** u dijagnostici oboljenja završnog dijela debelog crijeva i analnog kanala je nezamjenjiv. **Anoskopija** se radi kod svih bolesnika.

Tabela 6. Dijagnostika Hemoroidalne bolesti

Dijagnostika	Broj	% odnos
Anamnestički podaci - Klinički nalaz	2.160	100,00
Deramtitis perianalis (egzema)	435	20,13
Anoskopija	2.160	100,00
Kolonoskopija	1.850	85,64
Digitorektalna egzaminacija funkcije sfinktera sa aktom stezanja	2.160	100,00
HPV bris analnog kanala, preparat: pozitivan HPV	164	7,6

Kolonoskopija je urađena kod 1.850 (85,64 %) predstavlja obavezujući dijagnostički protokol. Kolonoskopski, registrovali smo neoplastički proces analnog kanala i debelog crijeva kod 229 (10,6 %) u kojim slučajevima se odustalo od operacije hemorida i nastavljen je dijagnostički protokol maligne bolesti.

Posebno ističemo **značaj digitorektalnog pregleda sa „aktom stezanja"** radi procjene funkcije čmarne muskulature koji nas usmjerava u ekstenzitet oštećenja mišića stezača čmara, koje ima odlučujući dijagnostički značaj za izbor operativnog postupka. Radi se kod svih bolesnika.

Nalaz dermatitisa /egcema/ perianalne kože registrovan u 435 (20,13 %) govori u prilog zakašnjele dijagnoze zbog ožiljne stenoze analnog kanala. Fibrozna stenoza ograničava funkciju analnog kanala, tako da se on ne može kompletno zatvoriti (fibroza) niti otvoriti, te crijevni sadržaj permanentno curi (vlaži) kroz analni kanal. Tako nastali perianalni dermatitis čiji ekstenzitet (osjet svraba anoperineuma) potvrđuje stepen stenoze. Perianalni dermatitis, takođe, je dobar dijagnostički znak i značajan pokazatelj oštećenja perianalne kože koja se koristi za anokutanu neoplastiku u IVa i IV b stadiju bolesti (7).

Od značaja je **bris sluznice i tkivnog preparata analnog kanala na HPV virus** koji zadnjih godina pokazuje povećanu učestalost. Na istraživanom materijalu je nađeno je 164 (7,6 %) HPV pozitivnih. Približne podatke imaju brojni autori (2,4,6,7,8)

Metode liječenja

Svi bolesnici su operisani minimalno invazivnim operativnim postupcima.

Metode **THD DG HAL RAR** predstavljaju „zlatni standard" liječenja hemoridalne bolesti do četvrtog stadija oboljenja. Na urađenih 1.016 (47,0 %) ispitanika metodom THD DG HAL RAR nismo registrovali ranih, niti kasnih komplikacija.

THD DG HAL-RAR sa kompleksnim reparatornim postupcima analnog sfinkternog mehanizma su primjenjene kod bolesnika u zapuštenom, četvrtom stadiju oboljenja kod 1035 (47,91 %). I ovu metodu prate odlični rezultati liječenja kao i DG HAL-RAR sa kompleksnim retkoanalnim reparatornim postupcima, ovisno do stadija bolesti **/IV a - stadij analne stenoze ili IV b - stadij analne atrofične dilatacije – „zjapeći anus"/**. Metoda zahtjeva izuzetnu stručnost tima i dugotrajnu fizikalnu terapiju analnog kanala. Ovu metodu je pratilo 4 (0,4 %) postoperativna krvarenja.

THD DG HAL, obzirom na visok procenat recidiva ne ispunjava potrebne hirurške kriterijume za liječenje hemoroidalne bolesti.

Na 16 (0,7 %) operacija DG HAL urađenih u našoj patologiji, bilo je 13 (82,25 %) ranih recidiva. Na 99 bolesnika operiranih u drugim ustanovama (recidivi), DG HAL je bio urađen kod 52 (52,52 %). Recidiv je nastao u kratkom vremenskom perodu nakon operacije. Nakon klasičnih operativnih postupaka, recidiva je bilo 47 (47,7 %).

Pritom, kod pomenutih recidiva, DG HAL-RAR metoda je urađena kod 52 (52,52 %), a DG HAL-RAR sa kompleksnim rektoanalnim reparativnim postupcima analnog kanala - kod 47 (47,47 %), sa odličnim rezultatima liječenja.

Priprema bolesnika za DG HAL, DG HAL – RAR i rektoanalne reparatorne postupke

Prijeoperativni protokol:

Informativni razgovor sa pacijentom mora mu pružiti sve informacije o sadašnjem stanju bolesti, posljedicama nastavljanja konzervativnog liječenja, benefitima operativne terapije i svim mogućim posljedicama neurađene operacije.

U osnovi, izbjegavanje pregleda su razlog razvoja bolesti u stadij komplikacija u čemu kumuju mišljenja kvazi „stručnjaka" koji je liječe „mastima i čepićima".

Samo komplikacije bolesti (krvarenje, prolaps, trombotičke manifestacije...) brutalno, natjeraju bolesnika ljekaru, koji se do tada plašio da mu se „šta drugo ne nađe", ili ima formirano mišljenje da se „hemoroidi ne operišu", jer se „hemoridi vraćaju".

Pravilo je da se bolesnici oboljeli od hemoroida, u našoj kazuistici javljaju ljekaru kod **teških anatomskih i funkcionalnih oštećenja,** kada više ne može izdržati smetnje. Poseban problem su **psihosomatske promjene oboljelog** zbog dugotrajne patnje koje bolesnik preživljava. Zbog toga bolesnici su neurotični, asocijalizirani, zabrinuti „da nemaju rak" „umorni od svega".

Još je Hipokrat u očima takvih bolesnika čitao i opisivao patnje kroz koje bolesnik prolazi. Zapazio je da mjesec dana nakon operacije „mutan pogled postaje bistar" sa prirodnim osmjehom zadovoljnog bolesnika. Upravo „čitanje izraza bolesnika" prije i poslije operacije govori o uspjehu onog ko se bavi ovom problematikom.

Neuropsihijatrijski bolesnici prestavljaju izuzetno težak sociomedicinski problem.

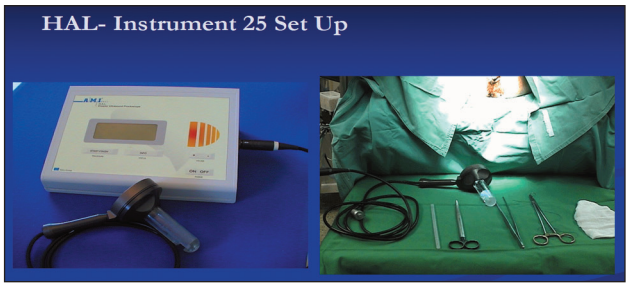
Nasuprot koloproktologu koji indicira adekvatno operativno liječenje, postoji **suprotstavljeno mišljenje kvazi „stručnjaka"** „da svako ima hemoroide" i da se „hemoroidi ne operišu", jer se poslije opearcije „vraćaju", nego se „liječe mastima i čepićima". Navedene sugestije kod bolesnika formiraju dilemu o potrebi operativnog liječenja.

Pred hirurgom takav bolesnik predstavlja težak izazov. Bolesnik i kvazi „stručnjak" " na jednoj strani i hirurg /stručnjak na drugoj, predstavljaju suprostavljenu enigmu koju hirurg treba riješiti. Pritom, operater - stručnjak preuzima veliku odgovornost i visok rizik budućih konfliktnih situacija sa operisanima u slučaju mogućih komplikacija.

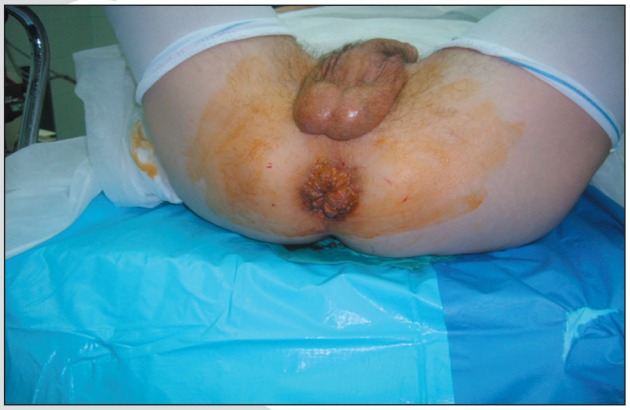
Stoga, prethodni pristanak uz potpis na operaciju nakon iscrpnih objašnjenja bolesti sa oboljelim, uz sva uvažavanja njegove privatnosti i svih mogućih posljedica predstavljaju neophodnost!

Prijeoperativna medikamentozna priprema operacija

Niskomolekularni antkoagulansi i Metronidazol daju se predoperativno. Položaj za operaciju je ginekološki. (Slika 7). Neposredno, uz operaciju uradi se kolonoskopija. Operacija se izvodi u lokalnoj, spinalnoj ili opštoj anesteziji. Pravi ekstenzitet procesa se vidi nakon uvoda u anesteziju.



Slika 6. Instrumenti i aparatura



Slika 7. Položaj bolesnika

Minimalno invazivni hirurski postupci u liječenju hemoiroidane bolesti

Na ukupno 2160 ispitanika, DG HAL je urađen kod 16 (0,7 %); DG HAL-RAR kod 1.109 (51,3 %); DG HAL RAR sa veoma složenim postupcima rektoanalne reapracije kod 1.035 (48,0 %). (Tabela 7).

Tabela 7. Hirurski postupci liječenja hemorooidalne bolesti

Hiruški postupak	Broj	%
DG HAL	16	0,7
DG HAL-RAR	1.109	51,3
DG HAL – RAR + ekscisio fibrosae+reparatio rectoanalis	1.035	47,9
UKUPNO	**2.160**	**100,00**

Indikacije za primjenu DG HAL su, samo komplikacije hemoroida prvog stadija stadijuma.

Evaluacijom rezultata liječenja hemoroida metodom DG HAL, na 16 (07 %) recidiva je bilo 13 (81,2 %) nakon 6-9 mjeseci po operaciji. Isti su riješeni THD, HAL-RAR sa odličnim ishodom. (Tabela 7).

Pritom, kod 3 (0,1 %) zbog analnog prolapsa, urađen je DG HAL-RAR sa reparatornim postupcima na analnom kanalu, takođe sa odličnim rezultatima.

Prema navedenom, DG HAL metoda predstavlja samo dio metode DH HAL-RAR u liječenju h.b. DG -HAL kao samostalna metoda nema indikacija za hirurško liječenje hemoroida.

Bilo je 99 recidiva kod bolesnika (Tabela 8) operiranih u drugim medicinskim ustanovama. Od tih 99 recidiva, DG HAL metodom je operirano 52 (52,52 %), koju te ustanove primjenjuju bez obzira na ekstenzitet oboljenja. Klasičnim operacijama je rađeno 48 (48,5 %) koji su ubrzo nakon operacije razvili recidiv.

Tabela 8. Operativni postupci nakon recidiva nastalih nakon operacija urađenih u drugim ustanovama na 99 recidiva

Operativni postupak	Broj op.	% odnos
DG HAL-RAR	52	52,5
DG HAL-RAR + Rep. anoneoplastike	47	48,5
UKUPNO:	**99**	**100,00**

Kod tih 99 recidiva kod bolesnika, DG HAL-RAR urađen je kod 52 (52,52 %), a kod 47 (48,5 %) DG HAL+ RAR sa brojnim kompleksnim reparatornim postupcima analnog kanala. Rezultati liječenja su bili odlični. Stoga, samo DG HAL, bez kombinacije sa RAR-om ne predstavlja metodu izbora liječenja hemoroidane bolesti. DG HAL ima indikacija u prevenciji i liječenju analnog prolapsa u djece, ili tromboze hemorida kod prvog stepena /stupnja/ bolesti.

Tabela 9. Recidivi nakon DG HAL /z.u. „Alea dr Kandić"/

Metoda liječenja	Broj operisanih	Broj recidiva	% odnos
DG HAL	16	13	81,2

Od 16 (0,7 %) rađenih DG HAL metodom, 13 (81, 2 %) bolesnika, ubrzo nakon operacije javilo se sa recidivnom bolešću. (Tabela 9).

Primjenom metode DG HAL RAR, na 1.109 (47,8 %) operiranih recidiva nije registrovano.

Recidiva nakon DG HAL RAR + Reparatorno-rekonstruktivnim postupcima na 1.035 (47,9 %) nije bilo.

Doppler Guide Ligation Haemorrhoidal Artery (THD, DG HAL)

Metoda se zasniva na doplerskoj identifikaciji hemoroidalnih vrpci i njihovoj visokoj ligaturi koja se postavlja na visini od 8-10 cm od dentate. Kod primjene metode DG HAL, ispod ligature hemoroidi ostaju netaknuti kao i njihove komunikacije, a time i hemoroidalna bolest.

Obzirom na visok broj recidiva, **DG HAL** nije potpuna metoda za hirurško liječenje hemoroida. Ona se, nažalost, primjenjuje kao jedina metoda u nekim medicinskim ustanovama.

Napominjem da je u z.u "Alea dr Kandić" DG HAL metoda primjenjivana u samom početku uvođenja hirurškog liječenja hemoroida. U tom periodu, na 16 (0,7 %) operacija DG HAL imali smo 13 (81,5%) recidiva - do dvije godine posmatranja. Nakon toga smo odustali od primjene DG HAL metode, jer, ona ne rješava uzrok hemoroidalne bolesti.

Iz drugih ustanova na 99 recidiva h.b., bilo je 47 (47,7 %) recidiva nastalih nakon DG HAL, i 52 (52,5 %) nakon primjenih klasičnih metoda (Tabela 8).

Za primjenu DG HAL metode anestezija nije potrebna, jer se radi u bezbolnoj zoni internih hemoroida. Radi se u ambulantnim uslovima, bez ležanja u bolnici.

Metoda je efikasna kod tromboze internih hemoroida najranijeg stadija. Pri rješavanju analnog prolapsa u djece potrebno ju je kombinovati sa DG HAL RAR.

Na osnovu rezultata istraživanja i literaturnih podatata, DG HAL, ne ispunjava uslove za operativno liječenje hemorida u čemu se slažu mnogi autori (1, 2, 3, 5, 6,7).

Doppler guide ligation haemorrhoidal artery – THD, DG HAL – RAR

Nakon sprovedene edukacije u Beču, 2005. godine, prihvatili smo DG HAL – RAR kao metodu izbora u liječenju hemoroidalne bolesti. Operativni i postoperativni komfor, odlični rezultati liječenja čine ovaj postupak "zlatnim standardom" u hirurškom liječenju hemoroida.

Na istraživanoj kazuistici zdravstvene ustanove "Alea dr Kandić", na 2.160 operisanih bolesnika,

metoda DG HAL RAR je primjenjena kod 1.109 (51,3% %) sa odličnim rezultatima liječenja u desetogodišnjem priodu istraživanja. Ranih i kasnih postoperativnih komplikacija nismo registrovali. Bolesnici se nakon operacije osjećaju preporođenim.

Liječenje hemoroida do IV stadija bolesti

Metoda DG HAL - RAR rješava uzroke bolesti

Specijalnim proktoskopom sa doplerskom sondom identificiraju se proširene hemoroidalne vrpce i ligiraju. Slijedi produžna longitudinalno-cirkumferena ligature unutrašnjih hemoroida, sve do denate, odnosno vrha hemoroidalnog prolapsa. Zatezanjem šava izvrši suspenzija hemoridalne vrpce i njena fiksacija za ostale slojeve crijevne stijenke što postavlja i fiksira hemoroid na primarnom mjestu. Na taj način se rješava uzrok bolesti.

Kako je do IV stadija očuvan analni sfinkter, a hemoroidalna komunikantna spojnica između internih i spoljnih hemoroida umjereno naznačena i sfinkterni mehanizam intaktan, nema potrebe atakovati na nju, osim u slučajevima posttrombotičke fisure, ili fisure sa spuštenom analnom papilom. U tim se slučajevima uz DG HAL-RAR metodu, potrebno je ekscidirati fisuru, ili posttrombotičku ulceraciju, a defekt prekriti režnjem kože spoljnjeg hemoroida.

Spoljni hemoroidi sa hemoroidalnom spojnicom sami nestaju nakon ovog postupka.

U osnovi nema "sječenja" niti "rezanja hemorida", što je osnov uzročnog rješavanja hemoroidalne bolesti. Iskusan stručnjak ovom metodom postiže odličan estetski i terapijski efekat.

RAR (Rektoanlani reparativni postupak) pri DG HAL-u, štedi hemororektalnu mukozu poznatu kao „plemenita zona detekcije stolice i vjetrova" koja se nalazi na prolabiranim internim hemoridima, a odgovorna je za funkciju regulacije kontinencije. Svaka trombonekroza hemorida je uništava.

Na našem materijalu tokom desetogodišnjeg istraživanja na ukupno 2.160 bolesnika, bilo je 1.109 (51,3 %) operiranih do četvrtog stadija oboljenja metodom DG HAL – RAR. (Tabela 10). Broj postavljenih ligatura iznosio je prosječno oko 8 do 12.

Prema podacima drugih autora broj ovih ligatura, prosječno se kreće oko osam (1,3,6,7,8, 9,14). Povećan broj ligatura ide u prilog kasnijeg javljanja bolesnika u našoj kazuistici.

Tabela 10. DG HAL – RAR

Operativna intervencija	Broj	% odnos
DG HAL – RAR	1.109	51,3
Ukupno na:	2.160	100,00

DG HAL-RAR metoda se radi bez anestezije, jer područje na kojem se radi je bezbolno.

Kod rascjepa nastalih posttrombotičkom fisurom ili spuštenom analnom papilom i prolabirajućih hemoroida sa hemoroidalnom spojnicom, i intaktnom muskulaturom stezača čmara potrebna je analgosedacija ili lokalna anestezija, obzirom da se radi na analnom kanalu koji je pokriven jako osjetljivom kožom zbog potrebe anokutanoplastike. Veoma je važno napomenuti da kod analnih fisura potrebno je riješiti uzrok nastanka (hemoride, papile, tu...), nikako sfinkterotomiju koja se, nažalost i danas, neuspješno primenjuje kod nekih "stručnjaka".

Nakon operacije DG HAL-RAR bolesnik ima osjet pritiska ili neispražnjenosti koja prolazi tokom 24 h. Veoma rijetko su potrebni antibiotici i analgetici. Liječenje u bolnici traje 24 h, potom bolesnik odlazi na kućno liječenje. Kontrole su na 6, 14, 30 dana, 3, 6 mjeseci, godina dana. Bolovanje traje 10-14 dana.

Liječenje hemoroida IVa stadija oboljenja - fibrozna stenoza analnog kanala - stadijum fibroze

Tabela 11. DG HAL – RAR + Excisio fibrosis + Reparatorna anocutanoneoplastica

Operativna intervencija	Broj	% odnos
DG HAL – RAR + excisio fibrosis + anokutanoplastika	580	56,0
DG HAL-RAR sa reparatornim postucima	455	44,7
Ukupno:	**1.035**	**100,00**

Na 1.035 (47,9 %), operacija kod bolesnika IV stadija bolesti, HAL-RAR sa anokutanoneoplastikom u IVa stadiju urađen je kod 580 (56,0 %), a HAL-RAR sa kompleksnim reparatornim postupcima analnog kanala i terminalnog rektuma u 455 (44,7 %). Rezultati liječenja primjenjene metode DG HAL RAR sa ekscizijom fibroze su odlični.

Nije bilo recidiva, infekcija, smetnji kontinencije. Imali smo 4 (0,4 %) postoperativnih hemoragija. Radilo se o bolesnicima sa koagulopatijama

koji su rađeni iz vitalnih indikacija (krvarenja). Napominjem da su indikacije za DG HAL RAR i hemoroidalna krvarenja.

Rezultati liječenja bolesnika kod kojih je urađena DG HAL-RAR sa rektoanalnim kompleksnim reparatornim postupcima su, takođe, izvan očekivanja, dobri.

Pato anatomo fiziološka zbivanja IVa i IV b stadija hemoridalne bolesti

U IV a stadiju fibrozom je zahvaćen analni kanal u njegovom jednom dijelu ili u čitavoj cirkumferenciji. Uzrok fibroze analnog kanala su tromboflebitisi, spuštene analne papile, hronične infekcije, mehanička oštećenja analne sluznice aktom defekacije, brojna druga oboljenja (gnojni procesi, tumori), povrede...

Fibroza nastala tokom zarastanja pomenutih komplikacija hemoroidalne bolesti progresivno zahvata analni kanal djelomično ili u čitavoj cirkumferenciji, sužavajući ga. Nastaje **progresivna substenoza sve do stenoze analnog kanala.** Prati je karakteristična klinička slika, sa oštećenjem funkcije i analnog kanala, smetnjama u pasaži stolice, upalnim procesom rektuma. Digitorektalni nalaz stenoze sa progresivnim smanjenjem jačine akta stezanja (koji u stadiju naznačene fibroze nedostaje ili je ravan nuli- fibroza), su veoma značajni. Mišići stezači čmara zbog imobilizacije u fibrozi postaju atrofični, jer mu fibroza onemogućava kontrakcije.

Smetnje u pasaži stolice kroz suženi analni kanal radi njene evakuacije postaju sve otežaniji. Stolica se zadržava u rektumu, raspada se, da bi kao raspala izašla („majka priroda"). Raspadnuta stolica u trektumu izaziva njegovu upalu, potom upalu ushodnog kolona stvarajući uslove za nastanak polipa, divertikula, tumora i drugih opštih manifestacija.

IVb stadij, stadij dilatacione atrofične fibroze

Dugotrajno imobilisani mišići stezača čmara u fibrozi progresivno atrofiraju. Zbog stenoze - fibroze i analnog kanala, sa posljedičnom hipotrofijom muksulature (afunkcija) tokom naprezanja radi evakuacije stolice nastaje progresivna dilatacija čmarnog kanala, što predstavlja ulazak u IV b stadij h.b. Značajan je i gubitak muksulofascijalnih struktura kod bolesnika koji su u uznapredovalom dobnom uzrastu. Hemoroidalna spojnica, koja spaja interni i spoljni hemorid, takođe fibrozira koje prekida komunikaciju spoljih sa internim hemoroidima. Dolazi do vidne regresije spoljnih hemorida koje, takođe zahvata fibroza. Pored čmarnog kanala, fibroza zahvata i interne hemoroide koji kroz nju probijaju kao grozdovi, podložni trombonekrozama. Fibroza zatvara analne žljezde sa posljedičnim gnojnim perianalnim procesima. Na ispitivanom materijalu je bilo 428 (18,9 %) gnojnih perianalnih procesa. **Navedeni proces fibroze je dugotrajan. Iznosi u prosjeku oko 30 godina!**

Anamnestički pacijent je prije mnogo godina imao simptomatologiju III ili IV stadija bolesti sa prolapsom, krvarenjima, bolovima i da su, kasnije, te tegobe i hemoroidi „nestali".

Često prilažu i nalaz gastroenterologa koji je prije desetak godina verifikovao III ili IV stadija hemoroida, a sada „hemoroide II stadija"!

Naprezanja prilikom defekacije, putovanja, proliva, zatvora, fizičkih poslova, teretane... u stadiju stenoze, vodi u dilataciju analnog kanaala i progresivni prolaps internih hemorida i sluznice rektuma izvan analnog kanala koji se zbog proširenog i afunkcionalnog čmara ne može povratiti unutar čmara. Nastaje trombonekroza prolabiranih hemoroida i ispale sluznice rektuma što predstavla poseban problem u kojem se najčešće, bolesnik javlja (različite gradacije hemoroidalnog, hemoridorektalnog prolapsa ili prokcidencije!).

U IVa stadiju srećemo promjene u ritmu pražnjenja stolice, najprije opstipaciju, nakon toga proljevaste stolice koje su veliki problem bolesnika. U IV b stadiju, stadiju dilatacione fibroze srećemo „zjapeći anus". Anali kanal koji je afunkcionalan, stvara uslove za prolapse sa permanentnim curenjem sadržaja i ojedima kože velikog dijela tijela. Brojne rezistentne infekcije urogenitalnog trakta su razarajuće!

Operativni zahvati liječenja hemoroida IV a stadija sastoje se iz dvije faze **koje se rade u jednom aktu.**

U prvoj fazi operacije se uradi DG HAL-RAR.

U drugoj fazi operacije, poznat kao ekscizija fibroze cirkumferencije analnog kanala sa reparatornom anoplastikom predstavlja posebni izazov i za ljekara koji se bavi ovom hirurgijom.

Pomenuta ekscizija fibroze moze sadržavati trećinu, polovinu ili kompletnu cirkumferenciju analnog kanala, ovisno od ekstenziteta fibroze.

Treba istaći da se u ovom stadiju radi ekscizija fibroze pokrova analnog kanala sa hemoridima spojnice koji su u fibrozi!!!

Ekscizija fibroze analne cirkumferencije treba biti poštedna ali cjelovito potrebna, kako bi se sfinkteri oslobodili fibroze koja im ne dozvoljava kontrakcije /funkciju stezača i opuštača čmara/. Zdrava sluznica analnog kanala, koja nije zahvaćena fibrozom mora se sačuvati zbog potrebne brže reparacije pokrova analnog kanala.

Kod kompletne fibroze analnog kanala sa izraženom stenozom, fibrotu je potrebno u cjelosti ekscidirati. Ponekada su analni mišići izuzetno atrofični, da praktično nedostaju, a postoje samo fibrozne niti.

U slučaju trombonekroze nastale zbog inkarceracije rektohemoroidanog prolapsa, u stadiju IVa (prolabiranog kroz suženu fibrozu), potrebno je odstraniti nekrotični dio, i fibrozu koja zahvata čmarni kanal, primjeniti brojne modifikacije reapratorne anoplastike. Potom, mobilizirati kutani režanj kojim se prekrije unutrašnjost analnog kanala fiksirajući je na ranije opisan način.

Mobilizacija anokutanog režnja je treći dio operacije kojim se prekriva defekt nastao ekscizijom fibroze ili trombonekroze.

Mobilizira se anokutani režanj ostatne kože spoljnjeg hemoroida sa okolnom perianalnom kožom. Isti se fiksira za rubove defekta ekscizije.

Prolaps crijeva u IVa/IVb stadiju se rješava veoma kompleksnim operativnim postupcima sakrofiksacijom, rijetko Delorme-ovim postupkom sa reparatornim anokutanoneoplastikama. Reparativna anokutanoplastika ima neprocjenjivu vrijednosti jer analni kanal prekriven kožnim flapom dobija mehanički i svaku drugu zaštitu. Posebnog značaja je što, kožni flap na analnom kanalu u daljem postoperativnom toku stvara uslove da analnom sfinkternom vraćamo normalnu anatomiju i poremećenu funkciju čmarnog kanala. Dodatno, fizikalnim terapijskim postupcima postiže se potrebna funkcionalnost i onemogućava se dalji slijed fibroze u IVb.

Kontrolisana kontinencija stolice i vjetrova je velika pogodnost za bolesnika. Istovremeno, kožni režanj na analnom kanalu prekida slijed diplazije epitela u malignu bolest.

Nakon ovih operacija dobra funkcija analnog kanala se uspostavlja fizikalnim terapijskim postupcima (masažom i Keggelovim vježbama) neočekivano vraća funkcionalnost mišiča stezača čmara u skoro normalnu. Akt stezanja mišića stezača čmara sa 0/1 ili 0/0 se u toku 2-3 mjeseca vraća na 3/4. Vraćanjem funkcije mišica stezača čmara stvaraju se uslovi za kompletno ispražnjavanje stolice što protektivno djeluje na upalni proces kolorektuma. Funkcija zatvaranja čmara rapidno poboljšava egcematozne promjene anoperianalno. Život se bolesniku mijenja iz korijena. Kontinentan bolesnik, koji do operacije nije bio kontinentan, i nije mogao da napusti mjesto stanovanja, nakon operacije dobija mogućnost da napusti stan, što predstavlja ogroman benefit. Znatan broj tih bolesnika sa inkontinencijom njegovala su nekoliko njegovatelja, a nakon operacije, isti samostalno završava svoje potrebe, bez potrebe za tuđu njegu i pomoć!!!

Tabela 12. Hirurški postupci liječenja hemorooidalne bolesti IVb stadija

Metoda	Broj	% odnos
DG HAL – RAR + ekscisio fibrosae+reparatio rectoanalis	1.035	47,9
Ukupno	**2.160**	**100,00**

U pomenutoj kazuistici na ukupno posmatranih 2.160 bolesnika, **IV stadija** je bilo 1.035 (47,91 %). Pritom, **IVa** stadij je bio zastupljen kod 580 (56,0 %), a **IVb** kod 455 (43,96,0 %), promatrajući broj bolesnika u IV stadiju.

IV b stadij hemoroidalne bolesti Dilataciona fibroza i „zjapeci anus"

Progresivna atrofija muskulature analnog kanala zbog imobilizacije i atrofije istog i dilataciona fibroza analog kanala predstavlja posebnu karakteristiku IVb stadija („zjapeći anus").

Tijekom progresivne atrofije mišića stezača čmara u stenozi (IVa stadij), nastaje progresivnom dilatacijom analnog kanala tako da, on iz stanja stenoze prelazi u stanje dilatacione fibroze (IVb stadij). Atrofija sfinkterne muskulature se naročito manifestuje u starosti.

Kako dilatacija analnog kanala progresivno napreduje (afunkcija analne muksulature) anus gubi svaku mogućnost zadržavanja prolapsa koji se progresivno pogoršava. Prolaps se javlja svakom

stolicom, potom u uspravnom položaju. Ekstenzitet prolapsa napreduje tako da kroz analni kanal ispadaju hemoroidi, rektum, na kraju kolon, što se manifestuje hemoroidorektokolonalnim prolapsom (prokcidencijom), gradusa I, II ili III.

Javlja se subinkontionencija sve kompletne inkontinencije, kod svih anorektalnih prolapsa nastalih opisanim slijedom hemoroidalne bolesti.

Slijede znači fekalne urgencije, koja progresivno vodi u inkontinenciju, što bolesniku ne dozvoljava udaljavanje od sanitarnog čvora i izlazak iz kuće. Bolesnik je osuđen na uloške.

Nakon operacije popravljena funkcija analnog sfinkterog mehanizma, bolesnika kome je do tada bila potrebna tuđa pomoć vraća u normalno stanje da sam sebi zadovoljava svoje potrebe.

Bolesnik je u poznim godinama, najčešće osobe ženskog spola pri čemu treba uzeti u obzir i porođajna oštećenja muskulature karlice, a kod muškaraca teška zanimanja. Obično se radi o samcima ili bolesnicima iz domova staraca koji bivaju dovedeni u takvom stanju.

Hirurško liječenje IV b stadija u stanju dilatacione fibroze analnog kanala poznato kao „zjapeci anus" – Hemoroido-ano-recto-kolonalni prolaps

Nakon što se uradi **DG HAL+ RAR internih hemoroida** slijedi **ekscizija fibroze analnog kanala** koja prekriva atrofični sfinkterni mehanizam u potrebnom opsegu.

Prolaps se rješava plikacijom koristeći eventualno ostatnu muskulaturu i fibrozu da otvor analnog kanala bude uloživ za jagodicu prsta uz plikatorne postupke. Nastali se defekt analnog kanala prekrije podminiranim i mobiliziranim /prepariranim/ režnjem kože ostatnih spoljnjih hemoroida i zdrave perianalne kože. Pritom se koriste režnjevi V-Y oblika koji se fiksiraju iznad dentate pojedinačnim šavima Vycrila 2/0, ili 3/0.

U slučajevima ano-rekto-kolonalnog prolapsa potrebne su dodatne korektivne procedure (Delorme, Parks metode, rektosakrofiksacije) uz sužavanje hiatus rekuma.

Poseban problem su nekrotične promjene na prolabiranom, inkarceriranom crijevu koje se moraju ekscidirati uz primjenu gore navedenih postupaka. Pritom, ekscizija nektoričnog dijela crijeva ili samo sliznice i hemoroida, uz operaciju po Delormeu i sakrofiksaciju ima dobar ishod.

Operativni postupak kod umjerenog stepena rektoanalnog prolapsa gr. I/II

Najprije se uradi DG HAL. DG HAL RAR sa ciljem rješavanja hemorida i uzroka poremećaja nedovoljne nedovoljne funkcije plemenite zone detekcije stolice i vjetrova. Slijedi ekscizija ožiljka koji je zahvatio cijelu cirkumferenciju analnog kanala. Atrofično dilatirani mišić stezač čmara sa fibrozom se u njegovoj prednjoj ili zadnjoj cirkumferenciji, ili u obje cirkumferencije plicira. Nakon toga se radi sakropeksija. U uznapredovalim slučajevima slučajevima primjenjujemo Delormeov postupak.

Prospektivno praćenje operisanih/ operiranih bolesnika sa primjenom anokutanoneoplastike

Od posebno značaja je **fizikalna terapija analog kanala nakon primjene reparatornih postupaka na analnom kanalu**.

Napomena:

Kod IV a stadija imamo substenozu do stenoze zbog fibroze analnog kanala.

Kod IV b stadija nalazimo dilatacionu atrofiju fibroze i čmarne muskulature sa „zjapećim anusom".

Nakon DG HAL-RAR metode potrebna je digitalna masaža čmara. Izvodi se 3-4 puta dnevno po 3-4 minute, počev od šestog postoperativnog dana uz primjenu lokalnih anestetika (gel).

Prospektivnim praćenjem funkcije stezača čmara u slučajevima atrofije istih, digitalna masaža se dopunjava intenzivnim i dugotrajnim Keggelovim vježbana, ovisno od stepena atrofije mišića.

Ovim postupkom, koji primjenjujemo zadnjih deset godina postigli smo nemjerljiv uspjeh u vraćanju oštećene anatomije i poremećene finkcije analnog sfinkternog mehanizma i funkcije regulacije kontinencije.

Začudo je, da se nakon 3-4 mjeseca fizikalne terapije, skoro subatrofični mišići stezača *čmara* se vraćaju funkciji potrebnoj za normalan život, čak i u slučajevima anorektalnih prolapsa sa skoro potpunom atrofijom sfinkerne muskulature! U tome najveći značaj ima *očuvana funkcija* internog sfinktera sa muskulaturom karlice čija se funkcija uspostavlja Keggelovim vježbama.

Patohistološki nalaz analnog pokrova i sluznice rektuma je obavezan

Na istraženom materijalu bilo je 127 (5,6 %) tu anorektuma, i kod 164 (7,6 % HPV infekcije. Proctitis chr ili proctitis activa, te proctitis erosiva registrovali smo kod 2.012 (93,1 %). Analna intraepitelijalna displazija gr. II povremeno i III do CIS imali smo kod 158 (7,3 %). Upravo ekscizija analne fibroze i njegovo oblaganje kožnim režnjem prekida slijed opisane displastičkih promjena analnog pokrova, sledstveno u kancer. Slične podatke imaju brojni autori (1, 2, 4, 5, 6, 7, 8, 9).

Posthemoroidalni proctitis

Patohistološki nalaz sluznice rektuma daje informacije o ekstentitetu **posthemoridalnog proctitisa** koji se najčešće manifestuje kao „proctitis erosiva", „proctitis activa", proctitis chronica" naročito u zapuštenim stadijumima bolesti.

Svi naši ispitanici od III stadija, imali PHD nalaz upalne bolesti crijeva (proctitis chr. ili erosiva), što daje smjernica za njihovo liječenje. Pritom topička terapija Salofalkom /supp. ili klizme/ uz fizikalnu terapiju analnog kanala daju odlične rezultate, što ima neprocjenjiv značaj za vraćanje njegove funkcije. Navedeno stvara uslove za adekvatno ispražnjavanje stolice koje izrazito povoljno djeluje na upalni proces rektuma i na opšte stanje bolesnog.

U osnovi liječenje hemoridalne bolesti podrazumjeva :

- Operativno liječenje hemoridioida izborom operativnog postupka shodno stadiju oboljenja.
- Liječenje sfinkternog mehanizma čmarnog kanala (fizikalna terapija).
- Liječenjem posthemoridalnog proctitisa i promjena na rektumu i kolonu.

Stručnjak koji ne primjenjuje navedene postupke u liječenju hemoridalne bolesti i ne poznaje komplikacije iste i ako hemoride liječi samo primjenom THD, DG HAL, ne bi se trebao baviti hirurgijom hemoroida, pogotovu hemoroida koju su zapuštenog stadija.

Iz zdravstvene ustanove „Alea dr Kandić" koja se liječenjem hemorida bavi na visokostručnom nivou (na čijem materijalu je izvršeno istraživanje), preneseni su izuzetno uspješni rezultati liječenja hemoridalne bolesti svih stadija. Njeni stručnjaci, zaista uspješno liječe hemoroidalnu bolest izborom adekvatne operativne procedure, liječenjem sfinkterne muskulature i posthemoroidalnog proctitisa. Bez navedenih kombinacija liječenje hemoroidalane bolesti ne daje dobre rezultate, a bolesnika porodicu i zajednicu skupo košta.

Zaključak

Minimalni invazivni postupci u lijecenju H.B. THD, DG HAL – RAR etiološki rješavaju bolest doplerskom identifikacijom i ligaturom krvnog suda koji je izazvao proširenje, odnosno, hemoroide. Plasiranom ligaturom se podigne i fiksira sluznica tog dijela debelog crijeva zajedno sa hemoroidom bez sječenja i rezanja. Tim se postupkom štedi anorektalna mukoza značajna za kontinenciju. Na našem materijalu u desetogodišnjem periodu metoda THD, DG HAL-RAR sa njenim kombinacijama ne daje niti rane niti kasne postoperativne komplikacije. Uspjesi liječenja H.B ovom metodom su odlični, što zaslužuje pažnju i opravdava primjenu ovog postupka. Metoda sa minimalnim atakom daje najbolje efekte. Jeftina je i ekonomski je opravdana jer je period postoperativnog liječenja skraćen. Nema dužeg bolovanja, bolesnik se rano vraća na posao. Ne daje invalidnost u usporedbi sa ranijim metodama klasičnih operacija.

Odgovor pristupu liječenja hemoroida je na ranoj dijagnostici i liječenju. Pored toga, izbor operativne procedure i u odnosu na stadij bolesti imaju primarni značaj u hirurškom liječenju.

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Book review: *Contemporary e-school*

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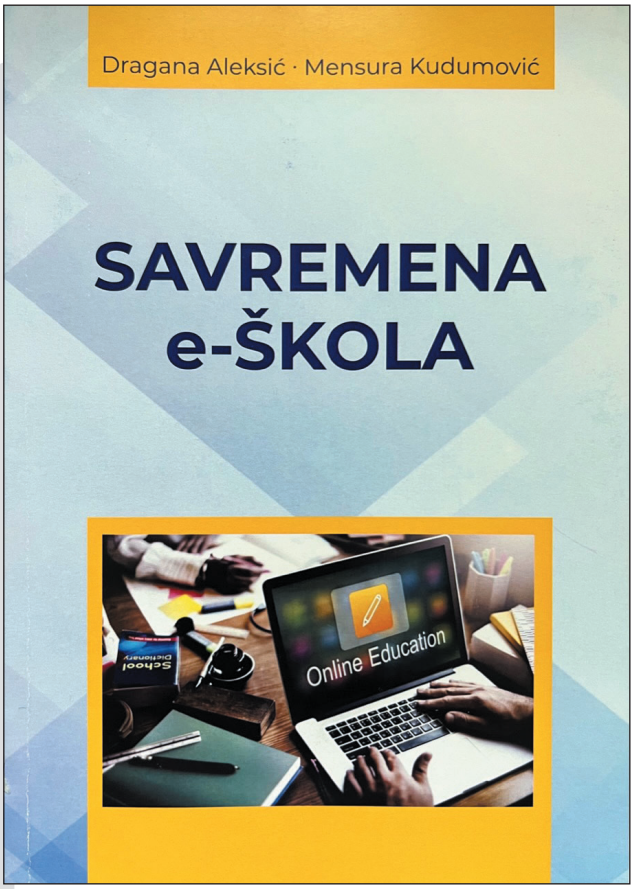
Today we often hear the word contemporary, whether this word refers to the school system, teaching and learning or refers to some special term from everyday life. It is known that we all strive for some perfection without flaws, whether it is related to our education or everyday life. Most people want to live modern lives, to be educated in modern institutions.

The book *Contemporary e-school* is primarily intended as a textbook to students who study pedagogy, classroom teaching, modern school management, informatics in education, as well as everyone else who wants to learn more from these areas. The book was written in order to include the current contents of today's study of informatics in schools as well as the transformation of the traditional school into the modern school, introduction of multimedia teaching, reengineering of the teaching process, creating new learning models, etc. In this book, in the introduction itself, the basic concepts necessary for the comprehension and understanding of the substance that was written, are clarified.

This textbook can provide good guidance towards lifelong learning and changes that we want in our education and refer to many research related to the development of quality education, which will definitely be possible to apply in future life. Development of technique and technology sometimes conditions us on the changes that we are exposed to, wanted we to admit it or not. What once in education was impossible and unreal, now becomes possible and real. The XXI century simply introduces us to the world of different school-related technologies and its classes and now we are even able to partly achieve our imagination.

The book *Contemporary e-school* represents a new beginning of learning supported by educational technologies based on a new learning, acquisition of different knowledge and of course, its application. It also indicates the changes in the organization and management of school as a whole



school organization and the problems that managers encountered in the previous system of organization and classes. As we have already mentioned, new learning models have also been proposed, which represent a new beginning of the modern school and its teaching system, which is certainly facilitating in the creation of modern education, which again opens some new research.

We believe that this textbook will be able to propose some new ways of learning and creating modern education, all with the goal of better, more successful and quality education, to the satisfaction of us all.

Characterization of Microbiological Pathogens and Antimicrobial Resistance Profiles in Skin and Mucosal Infections Among Outpatients in Sarajevo Canton, Q1 2024

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Abstract

Skin and mucosal infections provide a considerable public health challenge, particularly in outpatient environments where treatments occur frequently prior to microbiological diagnoses. This includes application of antibiotics. Further on, it has been found that the increased antimicrobial resistance (AMR) in the context of application of antibiotics, is associated with the treatment complexities, and consequently increase risks of complications and expenses of treatment. Increased Antimicrobial Resistance has been defined as a global challenge and this study aims to identify the predominant causal agents of skin and mucosal diseases and evaluate their antibiotic susceptibility profiles in Sarajevo Canton in Bosnia and Herzegovina during the first quarter of 2024.

Data were meticulously examined from microbiological laboratory records covering the period from January to March 2024, incorporating swab results from the skin and mucosa of outpatient cases. Isolates were identified through established microbiological techniques, and antimicrobial susceptibility was assessed using the disk-diffusion method in accordance with EUCAST standards.

A total of 5,227 samples containing identified pathogens were documented. The predominant etiological agent identified was Staphylococcus aureus (54.3% cases), followed by Escherichia coli (11.7%), Pseudomonas spp. (7.3%), Proteus spp. (5.5%), and MRSA (S. aureus - MRSA) (2.9%).

In regard to Antimicrobial Resistance in 90% of Staphylococcus aureus was showing resistance to Penicillin G. In contrast, susceptibility rates for Clindamycin, Cefoxitin, and Vancomycin were notably high, exceeding 95%. Strains of MRSA exhibited notable resistance to beta-lactam antibiotics while maintaining susceptibility to Linezolid and Vancomycin.

The findings indicate that Staphylococcus aureus continues to be the predominant pathogen in skin and mucosal infections, aligning with worldwide trends. The detection of MRSA and other resistant strains underscores the necessity for continuous monitoring of antimicrobial resistance and the judicious use of antibiotics in outpatient care.

Keywords: *skin infections, mucosal infections, antimicrobial resistance, Staphylococcus aureus, MRSA, outpatients.*

Introduction

Skin and mucosal infections pose a considerable medical problem in both inpatient and outpatient environments. Significant public health concern starts especially in outpatient settings where empirical treatment is frequently initiated prior to microbiological diagnoses. Consequently, the rising prevalence of antibiotic resistance exacerbates difficulties. (3)

Skin and mucosal infections are initiated by the entrance of the microorganism, usually a variety of bacteria, through a breach of the skin or mucosa. Pathogens can infiltrate via a hair follicle or compromised skin, potentially caused by scratches, puncture wounds, surgical interventions, burns, insect or animal bites, open wounds, or pre-existing dermatological diseases, and it can further involve local structures or spread to distant organs to generate life-threatening invasive infections such as bacteremia, pneumonia, and osteomyelitis.

Staphylococcus is since the beginning of the microbiological era recognized as an important pathogen responsible for infections in the healthcare setting and in the community. (1,4)

Futher on, bacterial antimicrobial resistance (AMR) is among a major public health threats of our time due to inability of the drugs, in particular antibiotics to be effective. (2) The escalating issue of antimicrobial resistance (AMR) is rendering the effective treatment of numerous diseases progressively more challenging. In here, Methicillin-resistant Staphylococcus aureus (MRSA), resistant to most frequently applied antibiotics, is presently the predominant cause of skin infections.

The aim of this study was to identify the most common causative agents of skin and mucosal infections and to analyse their antimicrobial susceptibility profiles in Sarajevo Canton during the first quarter of 2024.

Materials and Methods

This retrospective analysis encompassed microbiological data regarding skin and mucosal infections in outpatients, gathered from January to March 2024 in primary healthcare facilities within Sarajevo Canton. The investigation utilised laboratory data from the Institute of Public Health of Sarajevo Canton for the same period, encompassing results from skin and mucosal swabs of outpatients. Isolates were identified by standard microbiological techniques, and antimicrobial susceptibility was assessed using the disc diffusion method in compliance with EUCAST criteria (5).

Results

The results show that in microbiological diagnostics of skin and mucosal infections among outpatients in Sarajevo Canton, out of a total of 5,227 samples, the most dominant pathogen was Staphylococcus aureus, isolated in more than half of the cases (2,837; 54.3%), followed by Escherichia coli (612; 11.7%), Pseudomonas spp. (384; 7.3%), commonly associated with wound and burn infections, Proteus spp. (290; 5.5%), and MRSA (152; 2.9%).

Table 1. Prevalence of the most common causative agents of skin and mucosal infections

Number	Causative agents	Representation (%)
1	*Staphylococcus aureus*	54,3%
2	*Escherichia coli*	11,7%
3	*Pseudomonas* spp.	7,3%
4	*Proteus* spp.	5,5%
5	*Staphylococcus aureus* – MRSA	2,9%
6	*Klebsiella* spp.	2,3%
7	*Enterobacter* spp.	1,5%
8	*Streptococcus* ß hemolyticus (gr. B)	1,4%
9	*Streptococcus* ß hemolyticus (gr. A)	1,1%
10	*Enterococcus faecalis*	0,7%
11	Other	11,2%
	Total	**100%**

Notable presence of other opportunistic pathogens such as Proteus spp., Klebsiella spp., and Enterobacter spp. indicates the complex etiology of community-acquired skin infections.

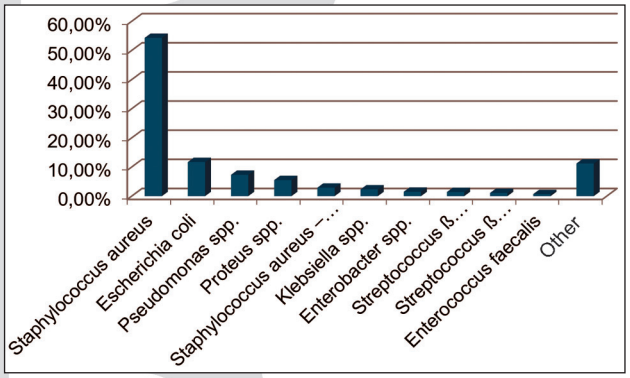

Chart 1. Overview of the Prevalence of the Most Common Causative Agents of Skin and Mucosal Infections

The presence of MRSA (2.9%) indicates the ongoing circulation of resistant strains in the outpatient setting. Gram-positive β-hemolytic streptococci of groups A and B, as well as *Enterococcus faecalis*, comprised a smaller but clinically significant portion of the isolates.

Infections caused by *Escherichia coli* are significantly more common in women, while *Staphylococcus aureus* and *Pseudomonas* species are almost equally distributed between both sexes. MRSA isolates are slightly more frequent in men.

Table 2. Distribution of most common skin and mucosal causes by sex

Pathogen	Female (n=2669)	Male (n=2060)
Staphylococcus aureus	54,64%	66,89%
Escherichia coli	17,84%	6,60%
Proteus species	5,55%	6,89%
Pseudomonas species	8,99%	6,99%
Staphylococcus aureus – MRSA	2,66%	3,93%
Other	10,32%	8,70%
Total	**100,00%**	**100,00%**

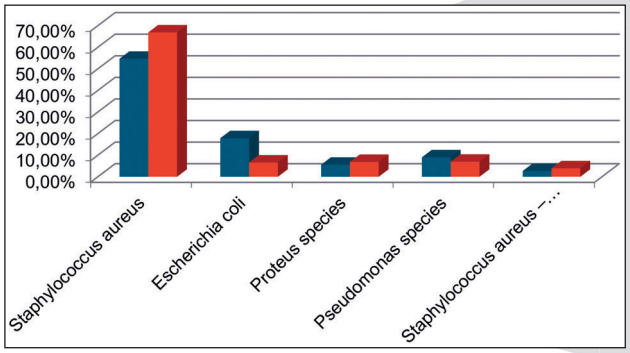

Chart 2. Overview of the most common causes of skin and mucous membrane infections by gender

An overview of antimicrobial resistance - *Staphylococcus aureus* is given in the following table.

Table 3. Antimicrobial resistance – Staphylococcus aureus

Antibiotic	Sensitive (S)	Intermedium (I)	Resistant (R)
Penicilin G	10%	0%	90%
Klindamicin	95%	2%	3%
Cefoksitin	96%	1%	3%
Trimetoprim-Sulfametoksazol	90%	3%	7%
Ciprofloksacin	85%	5%	10%
Gentamicin	93%	2%	5%
Eritromicin	70%	5%	25%
Vankomicin	100%	0%	0%
Linezolid	100%	0%	0%

During the observed period, a high rate of resistance was recorded for penicillin G (90%) and erythromycin (25%), while preserved susceptibility to clindamycin, vancomycin, and linezolid indicates maintained effectiveness of these antibiotics in treatment.

The presence of MRSA strains (2.9%) represents a concerning but still relatively low proportion in the outpatient population, which necessitates continuous monitoring. The recorded resistance of MRSA strains to beta-lactam antibiotics confirms their clinical resistance, while susceptibility to vancomycin and linezolid offers therapeutic options.

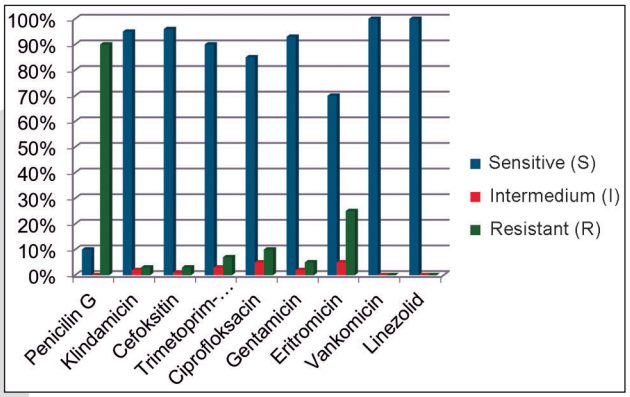

Chart 3. Overview of Antimicrobial Resistance – Staphylococcus aureus

Table 4. Antimicrobial Resistance – MRSA

Antibiotic	(S)	(I)	(R)
Cefoksitin	0%	0%	100%
Penicilin G	0%	0%	100%
Klindamicin	75%	5%	20%
Trimetoprim-Sulfametoksazol	88%	3%	9%
Linezolid	100%	0%	0%
Vankomicin	100%	0%	0%

The presence of MRSA strains (2.9%) represents a concerning, yet still relatively low proportion in the outpatient population, requiring continuous monitoring. The recorded resistance of MRSA strains to beta-lactams confirms their clinical resistance, while susceptibility to vancomycin and linezolid provides therapeutic options.

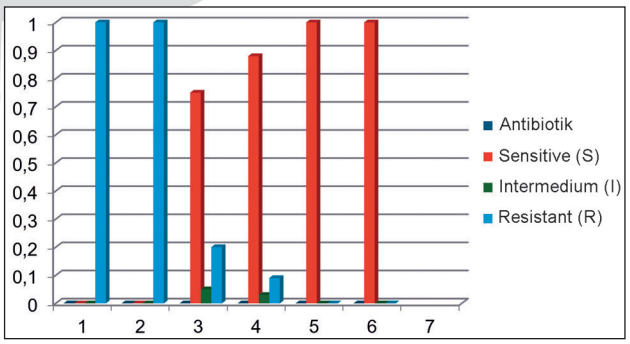

Chart 4. Overview of Antimicrobial Resistance – MRSA

Although the proportion of MRSA among the total causative agents of skin and mucosal infections was 2.9%, which is below the global average in many regions, its presence in the outpatient population is a cause for caution. The presence of MRSA outside the hospital system (so-called CA-MRSA) indicates the spread of resistant strains in the community, which can have significant public health consequences. A positive aspect is the high susceptibility of MRSA isolates to vancomycin, linezolid, and to some extent clindamycin and trimethoprim-sulfamethoxazole, which still allows effective treatment. However, continuous monitoring, microbiological surveillance, and rational antibiotic use remain crucial to prevent further resistance increase.

Besides *S. aureus*, significant isolates include *Escherichia coli*, *Pseudomonas* spp., and *Proteus* spp., which can cause more complex infections and whose antimicrobial resistance must also be monitored. These data emphasize the need for rational antibiotic use and enhanced microbiological testing prior to therapy initiation.

Conclusion

In Sarajevo Canton, skin and mucosal infections in outpatients are predominantly attributed to Staphylococcus aureus, exhibiting a substantial level of penicillin resistance, although MRSA strains represent a notable yet restricted proportion of the isolates. Ongoing monitoring of antimicrobial resistance is essential for effective therapy management and the avoidance of resistant strain dissemination.

While the present prevalence of MRSA isolates is not concerning, their existence in the outpatient demographic necessitates vigilant surveillance and continuous evaluation of treatment approaches. Ongoing microbiological monitoring and the enforcement of antimicrobial policy, coupled with the education of healthcare professionals and the public, are crucial for mitigating the dissemination of resistance strains.

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Instructions for the authors

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Abstract

In this paper the instructions for preparing camera ready paper for the Journal are given. The reco-mmended, but not limited text processor is Microsoft Word. Insert an abstract of 50-100 words, giving a brief account of the most relevant aspects of the paper. It is recommended to use up to 5 key words.

Key words: Camera ready paper, Journal.

Introduction

In order to effect high quality of Papers, the authors are requested to follow instructions given in this sample paper. Regular length of the papers is 5 to 12 pages. Articles must be proofread by an expert native speaker of English language. Can't be accepted articles with grammatical and spelling errors.

Instructions for the authors

Times New Roman 12 points font should be used for normal text. Manuscript have to be prepared in a two column separated by 5 mm. The margins for A4 (210×297 mm2) paper are given in Table 1.

Table 1. Page layout description

Paper size	A4
Top margin	20 mm
Bottom margin	20 mm
Left margin	20 mm
Right margin	18 mm
Column Spacing	5 mm

Regular paper may be divided in a number of sections. Section titles (including references and acknowledgement) should be typed using 12 pt fonts with **bold** option. For numbering use Times New Roman number. Sections can be split in subsection, which should be typed 12 pt *Italic* option. Figures should be one column wide. If it is impossible to place figure in one column, two column wide figures is allowed. Each figure must have a caption under the figure. Figures must be a resolution of 300 DPI, saved in TIFF format, width 10 cm min. For the figure captions 12 pt *Italic* font should be used. (1)

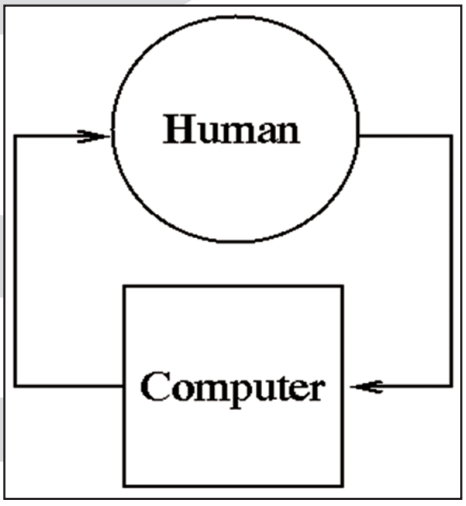

Figure 1. Text here

Conclusion

Be brief and give most important conclusion from your paper. Do not use equations and figures here.

Acknowledgements (If any)

These and the Reference headings are in bold but have no numbers.

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