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Maladaptive perfectionism among preclinical medical students

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Abstract

Introduction: Medical school can be very stressful period for many medical students. Perfectionism has been shown to commonly manifest in medical students, as the medical field recruits and rewards high achievers.

Methods: This cross-sectional study was conducted at the University of Sarajevo-Faculty of Medicine during the summer semester of 2023, accounting for 188 preclinical medical students, all of whom enrolled for the first time in the current semester. Data were obtained using a socio-demographic questionnaire, the Ten-Item Personality Inventory and the Almost Perfect Scale-Revised.

Results: Out of 188 preclinical medical students, 143 (76.1%) were female students. The average age was 19.9 ± 1.2 years. Maladaptive perfectionism was noted among 66% of students. Negative correlation was registered between extraversion on the TIPI scale and maladaptive perfectionism, with $r = -0.287$.

Conclusion: Being involved in a competing field as medicine results in a frequent occurrence of maladaptive perfectionism among medical students.

Key words: mental health, maladaptive perfectionism, medical students

Introduction

There are accumulating shreds of evidence showing a high risk of poor mental health among medical students and professionals. Given the enormous pressure during medical school admission, as well as the stressors notable to occur during the preclinical years of medical school, medical students

experience higher rates of psychological distress than their colleagues pursuing different careers (1).

Perfectionism is seen in two forms, adaptive and maladaptive. Maladaptive perfectionism takes place when individuals endure highly self-critical when their demands are not fulfilled, linked with higher depression and burnout rates (2). Maladaptive perfectionists are characterized as facing increased levels of distress as they pursue unattainable standards and goals. Their motivation is driven by a fear of failure and criticism, and they endeavor to evade feelings of inferiority (3).

Medicine is a competing field that draws ambitious, high-achieving individuals and it comes as no surprise that many medical students manifest features of perfectionism. Several studies have found significant differences in medical students' perfectionism levels in contrast to students pursuing other non-healthcare degrees (4). Many studies have linked perfectionism to a range of psychological concerns including depression, anxiety, obsessive-compulsive disorder and eating disorders. These studies offer proof of harmful consequences linked to maladaptive perfectionism (5).

This study aimed to detect the occurrence of maladaptive perfectionism among preclinical medical students, as well as examine its association with socio-demographic and personality characteristics.

Examinees and methods

This cross-sectional study was conducted at the University of Sarajevo-Faculty of Medicine during summer semester 2023, accounting 188 preclinical medical students, all of whom enrolled for the first time in the current semester. Each stu-

dent signed a written consent for being subjected to the research. The Ethical Committee of the Faculty of Medicine had given approval to conduct the research.

Data were obtained using a socio-demographic questionnaire, the Ten-Item Personality Inventory and the Almost Perfect Scale-Revised.

The sociodemographic questionnaire included questions about age, gender, previously completed education, place of residence during studies, and academic achievement (passed exams in the previous semester and the average grade point).

Participants' personality was assessed using the Ten-Item Personality Inventory (TIPI). TIPI is comprised of 10 items, each scored from 1 (strongly disagree) to 7 (strongly agree). Each dimension of the Big Five-factor (E-Extraversion, A-Agreeableness, C-Conscientiousness, ES-Emotional Stability and O-Openness) is represented by two items. The reverse-scored items are 2, 4, 6, 8, 10 (6). A higher score indicates a higher level of the trait (7).

The Almost Perfect Scale-Revised (APS-R) is designed to measure the multidimensional construct of perfectionism through three subscales: Standards, Order, and Discrepancy. Standards subscale represents personal strivings; Order measures need for organization and order, and Discrepancy subscale assesses the perceived gap between performance and standards. Participants respond to items on these subscales using a 7-point item-response scale from 1 = strongly disagree to 7 = strongly agree. Higher scores represent higher levels of performance expectations, preferences for order, and self-critical perfectionistic concerns (8-10). High scores on Standards and Discrepancy subscales were considered maladaptive perfectionism.

Printed copies of the questionnaires were distributed to students at the beginning of their class

and a verbal description of the research was provided by one of the investigators. Students returned completed questionnaires immediately after filling them.

Statistical analysis

Data were evaluated by standard statistical procedures and presented in tables. Demographic characteristics of students were evaluated using descriptive statistics. Associations between study variables were quantified using Pearson's correlation coefficients for continuous scales and chi-squared tests for categorical indicator variables. The $p < 0.05$ was considered statistically significant.

Results

Out of 188 preclinical medical students who participated in the study, 146 (77.7%) were first-year medical students, and the rest were third-year medical students, with 143 of them (76.1%) being female students.

The average age was 19.9 ± 1.2 years. Prior to studying medicine 60.6% students attended Gymnasiums and 33.5% attended medical high schools. Analysis showed that 51.1% students live separated from their families during their studies.

Only 36.7% of students passed all the exams from the last semester. The average grade during studies for those who have passed all the exams's 8.4 ± 0.4 .

The Revised Almost Perfect Scale has revealed that 66% of students had maladaptive perfectionism. No statistically significant difference was recorded in the occurrence of maladaptive perfectionism between first year and third year students, nor between female and male students.

Table 1. Maladaptive perfectionism and extraversion

			Extraversion			Total
			Low score	Normal score	High score	
Maladaptive perfectionism	No	N	8	26	30	64
		%	15.4	33.8	50.8	34
	Yes	N	44	51	29	124
		%	84.6	66.2	49.2	66
Total		N	52	77	59	188
%			100	100	100	

Negative correlation was registered between extraversion on the TIPI scale and maladaptive perfectionism with $r=-0,287$ (Table 1). There was no significant correlation between other domains of TIPI and maladaptive perfectionism.

No statistically significant correlation was found between academic success and the presence of maladaptive perfectionism.

Discussion

Several research studies have substantiated that a significant portion of university students exhibit perfectionistic tendencies, with roughly two-thirds of students falling into the category of perfectionists, which is consistent with our results showing that 66% of students had maladaptive perfectionism (11).

While some aspects of perfectionism such as attention to detail and high-performance standards may be beneficial for medical students, maladaptive perfectionism may result in more harm than good. Medical students have been identified as high achievers and perfectionistic, and as such may be challenged by ambiguity. Personality has been shown to influence coping with stress during studies (12, 13). Our study results have shown that extroversion's negatively correlated with maladaptive perfectionism.

Maladaptive perfectionists set exceptionally high or unrealistic standards for themselves, perceiving things as either flawless or complete failures. They often hesitate to take action due to an intense fear of making mistakes and failing (14). Thus, it is often seen among medical students that maladaptive perfectionism is connected with distress and lower academic performance (15). However, our results didn't reveal a significant correlation between maladaptive perfectionism and academic success.

There are several limitations in the presented study. The population in our study is represented by a sample of only first and third-year students at a single medical faculty, thus additional research is needed not only to determine the frequency of maladaptive perfectionism among medical students, but the best ways to support students in overcoming these feelings during medical education and future training, too. The study is also lim-

ited by the self-reported nature of the responses. However, all responses were anonymous, thus we believe they are likely to reflect the real feelings of the students.

Conclusion

Maladaptive perfectionists establish exceedingly high or unattainable standards for themselves. It's not uncommon to encounter maladaptive perfectionism within the population of medical students.

Although certain aspects of perfectionism can be advantageous for medical students, maladaptive perfectionism may lead to more negative outcomes than positive ones.

References

1. Brennan-Wydra E, Chung HW, Angoff N, ChenFeng J, Phillips A, Schreiber J et al. Maladaptive Perfectionism, Impostor Phenomenon, and Suicidal Ideation Among Medical Students. *Acad Psychiatry*. 2021; 45(6): 708-715.
2. Rafaqat W, Sami A, Ibrahim MT, Ibad H, Awais S, Memon A et al. Impact of Perfectionism and Resilience on Empathy in Medical Students: A Cross-Sectional Study. *J Patient Exp*. 2022; 9: 23743735221106603.
3. Zuo Z, Zhang X. A randomized controlled trial of group CBT with positive psychotherapy intervention for university students with maladaptive perfectionism in China. *Front Psychol*. 2023; 14: 1161575.
4. Seeliger H, Harendza S. Is perfect good? – Dimensions of perfectionism in newly admitted medical students. *BMC Med Educ*. 2017; 17: 206.
5. Hu KS, Chibnall JT, Slavin SJ. Maladaptive Perfectionism, Impostorism, and Cognitive Distortions: Threats to the Mental Health of Pre-clinical Medical Students. *Acad Psychiatry*. 2019; 43(4): 381–385.
6. Ten Item Personality Measure (TIPI). Available from: <https://gosling.psy.utexas.edu/scales-weve-developed/ten-item-personality-measure-tipi/>. Accessed February 10, 2023.
7. Iwasa H, Yoshida Y, Walla P, Walla P. Psychometric evaluation of the Japanese version of Ten-Item Personality Inventory (TIPI-J) among middle-aged, and elderly adults: concurrent validity, internal consistency and test-retest reliability. *Cogent Psychol*. 2018; 5(1): 1426256.

8. Slaney RB, Mobley M, Trippi J, Ashby J, Johnson DG. *The Almost Perfect Scale-Revised*. Unpublished manuscript. The Pennsylvania State University, University Park, 1996.
9. Slaney RB, Rice KG, Ashby JS. *A programmatic approach to measuring perfectionism: The Almost Perfect Scales*. In G. L. Flett & P. L. Hewitt (Eds.), *Perfectionism: Theory, research, and treatment* Washington, DC: American Psychological Association. 2002; 63-88.
10. Slaney R, Rice KG, Mobley M, Trippi J, Ashby J. *The Revised Almost Perfect Scale*. *Measurement and Evaluation in Counseling and Development*, 2001; 34: 130-145
11. Grzegorek JL, Slaney RB, Franze S, Rice KG. *Self-criticism, dependency, self-esteem, and grade point average satisfaction among clusters of perfectionists and nonperfectionists*. *Journal of Counseling Psychology*. 2004; 51(2): 192–196.
12. Thomas M, Bigatti S. *Perfectionism, impostor phenomenon, and mental health in medicine: a literature review*. *Int J Med Educ*. 2020; 11: 201-213.
13. Leung J, Cloninger CR, Hong BA, Cloninger KM, Eley DS. *Temperament and character profiles of medical students associated with tolerance of ambiguity and perfectionism*. *PeerJ*. 2019; 7: e7109.
14. Smith MM, Sherry SB, Vidovic V, Saklofske, DH, Stoeber J, Benoit A. *Perfectionism and the five-factor model of personality: A meta-analytic review*. *Personality and Social Psychology Review*. 2019; 23(4): 367–390.
15. Bußenius L, Harendza S. *The relationship between perfectionism and symptoms of depression in medical school applicants*. *BMC Med Educ*. 2019; 19(1): 370.

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Disease Management: Pyonephrosis In A 45-year Old Patient With Severe Scoliosis and Paraplegia – Case Study Presentation

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Abstract

In this paper we present case of 45-year old patient with pyonephrosis, severe scoliosis and paraplegia. Pyonephrosis is uncommon disease associated with suppurative destruction of renal parenchyma. Fever, shivering and flank pain are frequent clinical symptoms. Scoliosis may be of varied etiology and tends to cause a restrictive ventilatory defect, along with ventilation-perfusion mismatch and hypoxemia. Preoperative evaluation for this patient revealed three important points: a high-risk difficult intubation (but probable easy face-mask ventilation) with no alternative to tracheal intubation because lateral positioning was required during the surgery; difficult intravenous access and inability to lie either in a prone or supine position. After the surgical procedures patient was admitted to central intensive care unit (ICU). Intensive respiratory therapy and pain management were prime concerns. He had no postoperative complications, and left the ICU three days later fully recovered.

Keywords: pyonephrosis, scoliosis, airway management, intensive care treatment

1. Introduction

Pyonephrosis is a disease causing suppurative destruction of the renal parenchyma. If it is not diagnosed early, it can worsen rapidly and cause the death of the patient with the development of septic shock. Clinical findings of the patients vary from asymptomatic bacteriuria (15%) to sepsis. Fever, chills, and flank pain are most commonly seen. Radiological tests such as ultrasound (USG), computed tomography (CT), urography, and ma-

gnetic resonance imaging (MRI) are used in the diagnosis of pyonephrosis. If the pus detected as a result of the investigations is not surgically drained, antibiotics may not be very effective. In this context percutaneous or open nephrostomy or ureteral catheter insertion is appropriate. However, nephrectomy can be considered as a good treatment option in case of a damaged kidney that has lost most of its functions [1, 2].

Scoliosis may be of varied etiology and tends to cause a restrictive ventilatory defect, along with ventilation-perfusion mismatch and hypoxemia. There is also cardiovascular involvement in the form of raised right heart pressures, mitral valve prolapse or congenital heart disease. Thus a careful pre-anaesthetic evaluation and optimization should be done. Intraoperatively temperature and fluid balance, positioning, spinal cord integrity testing and blood conservation techniques are to be kept in mind. Many similar characteristics can be observed in these patients: a relatively large head, usually have a big tongue and pronounced adenoid vegetations, while hyperextension of the neck should be avoided due to the possibility of cervical cord compression, deformities of spine, left axis deformation. In addition, these abnormalities may have repercussions on other organs or systems, in particular the respiratory system. Perioperative management of these patients can be challenging for anaesthesiologists, especially because airway management is often difficult. We report the challenging airway management, vascular access and efforts made to obtain a safe positioning in such a patient. After the surgical procedures intensive respiratory therapy and pain management are prime concerns.

2. Case study presentation

Patient was admitted to the Nephrology Clinic through the Emergency Dept, from the Cantonal Hospital. During the hospitalization patient was examined by multidisciplinary doctors council: nephrologist, thoracic and abdominal surgeons, urologist, pulmonologist, cardiologist, gastroenterologist and anesthesiologist. Computed tomography (CT) of chest, abdomen and pelvis revealed: large left pleural effusion and atelectasis of the pulmonary parenchyma; no CT signs of pneumoperitoneum; the left kidney was larger, inhomogeneous parenchyma, which is a tapered, highly dilated collecting system that is filled with denser content – pyonephrosis, smaller fluid collection was noted in the abdomen extending into pelvis with enhancing walls. The same day pleural puncture was performed by the thoracic surgeon and about 500 cc of serohemorrhagic content was evacuated. Spirometry registered severe ventilatory failure of a mixed, predominantly obstructive type with extremely low flow rates in smaller airway parts. Cardiologist findings: “ECG: Sinus rhythm, HR 100/min, left ventricular hypertrophy, without ischemia. Dg: Cor hypertonicum. HTA gr III.” The patient has been on hemodialysis and since then he has been a hypertensive without spontaneous diuresis (*anuria persisted*). Left primary nephrectomy was performed as the treatment in our case. Routine blood investigations revealed no abnormality.

Preoperative anaesthetic evaluation revealed a man with shorter stature, weighing 40 kg and height 140 cm. He was in a sitting position supported and surrounded by pillows, and could not lie either in a supine or a prone position. He had a significant scoliosis deformity - expressed left-convective scoliosis with deformation of acetabulum, neck and head of both femurs with surrounding dystrophic calcifications., shorter limbs with fixed flexion deformities elbows; with a short fixed neck, adequate mouth opening (interincisor distance 3 cm) and a Mallampati score of III; hypertension. Since his childhood he was paraplegic (*in a wheelchair*), cannot lie on his back - the semicircular position is occupied, dehydrated, conscious, slightly agitated, tachycardic, anorexic. His chest was asymmetrical, deformed, auscultatory weakened discontinuous noise, left unmoved.

Preoperative evaluation revealed three important points: a high-risk difficult intubation (but probable easy face-mask ventilation) with no alternative to tracheal intubation because lateral positioning was required during the surgery; difficult intravenous access and inability to lie either in a prone or supine position. In view of the clinical situation and after a multidisciplinary discussion between anaesthesiologists, surgeons, pulmonary specialists and cardiologist, we prepared an algorithm considering the different available approaches. The algorithm is based on four points: basic preparation for difficult airway; availability of trained physicians; spontaneous breathing; and, fibreoptic-guided intubation, if necessary. It is accepted that use of an algorithm improves patient management, safety and efficacy. The anaesthesiology team met the patient and the whole procedure was extensively described and the challenges were explained. After the surgical procedures patient was admitted to central intensive care unit (ICU). Intensive respiratory therapy and pain management were prime concerns. He had no postoperative complications, and left the ICU three days later fully recovered.

3. Discussion

Pyonephrosis is a rare disease and upper urinary tract system infections and obstructions play a role in its etiology. There are multiple infectious agents (*Escherichia coli*, *Enterococcus* species, *Candida*, *Klebsiella*, *Proteus*, etc.) in the infection group and stones (staghorn in 75%), yeast balls, metastatic tumors (testicular cancer, colon cancer, etc.), pregnancy, and ureteropelvic junction (UPJ) obstruction in the obstruction group. It may also appear as a complication of past urologic surgery and chronic pyelonephritis. The accumulation of purulent exudate in the hydronephrotic collecting system and abscess formation constitute the pathophysiology of pyonephrosis (1). Clinical findings of the patients vary from asymptomatic bacteriuria (15%) to sepsis. Fever, chills, and flank pain are most commonly seen. Rabii et al. found lumbar pain in 70% of 14 pyonephrosis cases, together with painful lumbar region on examination in 5 cases and fever, chills, and pyuria in all cases (2). The etiology was identified as urinary lithiasis in 71% of the ca-

ses (2). St Lezin et al. found nephrolithiasis in 17 of 23 pyonephrosis cases and performed nephrectomy in five cases (3). Pyuria is seen very commonly in pyonephrosis and may sometimes be nonspecific. Bacteriuria, fever, pain, and leukocytosis may be absent in 30% of the cases.

Ultrasound (USG) and computed tomography (CT) are the methods generally used for the diagnosis of pyonephrosis. However, CT is more effective than USG as it identifies renal function, causes of obstruction (stone, retroperitoneal fibrosis, metastatic masses, etc.), and abdominal pathologies such as hydronephrosis better. Fultz et al. found that CT was a very sensitive radiological diagnostic method in the study they conducted on 17 pyonephrosis plus hydronephrosis cases (4). We also obtained diagnostic information with computed tomography in our case study. Antibiotics have no effect in pyonephrosis unless the pus is surgically drained. Percutaneous nephrostomy and urethral catheter insertion are therefore necessary. Studies show percutaneous drainage to be a fast, trusted, and effective diagnostic and therapeutic method (1, 3, 5). Radical nephrectomy can be the preferred treatment for a kidney that has lost most of its function. Nephrectomy has been found to have fewer complications compared to other treatments (6, 7).

4. Conclusion

After the surgical procedures patient was admitted to central intensive care unit (ICU). Intensive respiratory therapy and pain management were prime concerns. He had no postoperative complications, and left the ICU three days later fully recovered.

References

1. Eroglu M, Kandirali E. "Akut Pyelonefrit ve pyonefroz," *Turkiye Klinikleri Journal of Surgical Medical Sciences*, 2007; 3(20): 24–28.
2. Rabii R, Joual A, Rais H. "Pyonephrosis: diagnosis and treatment: a review of 14 cases," *Annales d'Urologie*, 2000; 34(3): 161–164.
3. Lezin M, Hofmann R, Stoller M. "Pyonephrosis: diagnosis and treatment," *British Journal of Urology*, 1992; 70(4): 360–363.
4. Fultz P, Hampton W, Totterman S. "Computed tomography of pyonephrosis," *Abdominal Imaging*, 1993; 18(1), 82–87.
5. Mokhmalji H, Braun M, Martinez P. "Percutaneous nephrostomy versus ureteral stents for diversion of hydronephrosis caused by stones: a prospective, randomized clinical trial," *Journal of Urology*, 2001; 165(4), 1088–1092.
6. Jimenez J, Lopez Pacios M, Llamazares G, Conejero J, Sole-Balcells F. "Treatment of pyonephrosis: a comparative study," *Journal of Urology*, 1978; 120(3), 287–289.
7. Androulakakis P. "Pyonephrosis: a critical review of 131 cases," *British Journal of Urology*, 1982; 54(2), 89–92.

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The role of hydrolyzed collagen type I & III (GelcoPEP) in skin health: a randomized, single-blind, and placebo-controlled investigation

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Abstract

Summary: Collagen, including hydrolyzed type I-III and native (undenatured) collagen type II sources, is recognized as a safe food ingredient, whose combination of amino acids stimulates collagen synthesis in extracellular matrix of several tissues, including skin.

Objective: The aim of the study was to develop a randomized, single-blind, placebo-controlled clinical study to investigate the effects of supplementation with GelcoPEP hydrolyzed collagen.

Method: Several questionnaires were administered with medical monitoring to measure the benefits of GelcoPEP hydrolyzed collagen on the skin.

Results: The tests showed improvement in hydration and elasticity, less appearance of expression lines and wrinkles, improving the appearance of hair and nails, reduction in the degree of cellulite, as well as a reduction in pores. Collagen supplementation had positive effects on skin aesthetics.

Conclusion: The use of hydrolyzed collagen type I & III (GelcoPEP) food ingredient improves the firmness and elasticity of the skin, reducing sagging. In this way, it can be used to stimulate anabolic processes in the skin, making it important for new studies to link it with aging.

Key words: hydrolyzed collagen; type I collagen; type II collagen; skin; randomized trial; placebo-controlled.

Introduction

In recent years, the cosmetics industry has grown considerably, as has its interest in developing effective and safe products. The creation of the Consumer Protection Code, the requirements

of the Health Surveillance Secretariat of the Ministry of Health and competition itself have led the industry to take a more cautious attitude with regard to the action and benefits of its products, seeking to associate its claims to scientific work.

Industry awareness and consumer demands have resulted in the adoption of a new procedure by cosmetics manufacturers: currently, companies are concerned with carrying out clinical allergenicity and efficacy tests before marketing, which are coordinated by dermatologists. This procedure offers the company credibility and trust among consumers.

A growing concern of the cosmetics industry is to avoid possible adverse reactions in users of their products. After all, consumers are much more critical of skin irritation caused by a cosmetic product than by a topical medication.

An adverse reaction is considered to be any sign or symptom triggered by a cosmetic product used correctly (Fisher, 1995). The irritation potential of a product depends on a series of variables: components used, concentration of ingredients, absorption, amount of product applied, condition of the skin, mode and frequency of application and cumulative effect (Dooms-Goossens, 1993).

Tests carried out on human beings are regulated according to very strict laws, with the aim of protecting and safeguarding individuals. These laws vary by country. In Brazil, these researches are permitted, as long as they have protocols approved by a Medical Ethics Committee and follow the precepts of the Declaration of Helsinki and Resolution 466/12 (Conselho nacional de saúde, 2012).

Use tests with the finished product, before its introduction to the market, are important to evaluate the safety of the product in real conditions of use (Baran & Maibach, 1994). It is also possible to

evaluate, through this test, in addition to allergenicity, the sensorial characteristics of the product, detecting additional complaints and comments regarding its “performance”.

The company is aware of the possible considerations and complaints that will arise during the marketing of the product, and can develop strategies, such as, for example, specific training of the Customer Service (SAC), prior to the launch of the product (BARAN & MAIBACH, 1994).

Objective

Evaluate the effectiveness of the use of collagen considering the parameters of the participants’ appreciation, under normal conditions of use.

Methodology

Selection of participants

Caracteristics of the selected participants Collagen			
Number of participants included in the study	51	Phototypes	II to IV
Gender	F	Age	40 to 62

Caracteristics of the selected participants Placebo			
Number of participants included in the study	51	Phototypes	II to IV
Gender	F	Age	40 to 65

Inclusion criteria
<ul style="list-style-type: none"> • Gender: female • Age: 40 to 65 years old • Phototypes: I to IV • Intact skin in the study region (nails and hair) • Occasional user of category products

Non-inclusion/exclusion criteria
<ul style="list-style-type: none"> • Skin marks in the experimental area that interfere with the assessment of possible skin reactions (pigmentation disorders, vascular malformations, scars, increased hairiness, large quantities of ephe- lides and nevus, sunburn) • Active dermatoses (local and disseminated) that may interfere with the study results • Pregnant or breastfeeding women • History of allergic reactions, irritation or intense sensations of discomfort to topical products: cosmetics and medicines • Participants with a history of allergy to the material used in the study • History of atopy • History of pathologies aggravated or triggered by ultraviolet radiation • People with immunodeficiencies • Kidney, heart or liver transplants • Intense sun exposure or tanning session up to 15 days before the initial assessment • Anticipated intense sun exposure or tanning session during the study period • Plan to take a swim in the sea, swimming pool or sauna during the study • Participants who practice water sports • Use of the following systemic topical medications: immunosuppressants, antihistamines, non-steroidal anti-inflammatory drugs, and corticosteroids up to two weeks before the selection • Treatment with acid vitamin A and/or its derivatives orally or topically up to 1 month before the start of the study • Expected vaccination during the study or up to 3 weeks before the study • Be participating in another study • Any condition not mentioned above that, in the opinion of the investigator, may compromise the evaluation of the study • History of lack of adherence or unwillingness to adhere to the study protocol • Professionals directly involved in carrying out this protocol and their families.

Restrictions imposed on participants
<ul style="list-style-type: none"> • Do not undergo aesthetic or dermatological treatments during the study. Medications prohibited during the study: <ul style="list-style-type: none"> ○ Anti-inflammatories ○ Antihistamines ○ Immunosuppressants ○ Acidic vitamin A and derivatives

Product information

Treatment

Product’s name: CCG TYPE.

Directions of use: Stir 10g of the product (two scoops) in your preferred drink, once homogeneous, ingest. Consume once a day.

Composition: protein ($\geq 90\%$), water ($\leq 10\%$), other salts.

Placebo

Product’s name: CMT TYPE.

Directions of use: Stir 10g of the product (two scoops) in your preferred drink, once homogeneous, ingest. Consume once a day.

Composition: maltodextrin.

Consent of Research Participants

The objective and methodology of the research were explained to the participants and they signed an Informed Consent Form.

Application of the Investigational Product

The product was given to participants to be used at home for 180 ± 2 days and they were duly instructed on how to use it according to the method of use informed.

Dermatological Medical Assessment of Clinical Signs and Sensations of Discomfort

An initial medical evaluation was carried out at the time of inclusion of participants to verify the absence of initial clinical signs incompatible with the inclusion of participants. After using the product, participants returned to the Institution for a final medical evaluation of the clinical signs presented and questioning of the sensations of discomfort felt.

The medical evaluation data were recorded in the investigation notebook. The doctor was available throughout the study to evaluate possible adverse events. The results were evaluated as follows:

- Sensations of discomfort: participants were asked about the sensations of discomfort they felt, in parallel with the clinical examination. The discomfort sensations reported were described in relation to nature (example: burning, itching, itching, tightness, cooling, heating, etc.); they were classified according to intensity as: light, moderate or intense; regarding location; and as for duration; and imputability to the test product was verified.
- Clinical signs: they were classified according to Table 1 and the causal link of reactions to the product was investigated.

Table 1. Classification of clinical signs – Dermatological Assessment

Clinical Signs									
(I) Nothing to report		(Ed) Edema		(Pu) Pustules		(Dr) Dryness/peeling			
(E) Erythema		(Pa) Papules		(Bu) Bubbles		(Cr) Crust			
(S) Soap effect		(C) Coloration		(No) Nodules		(V) Vesicle			
Classification of Clinical Signs									
Vesicles or papules	1	N = 1 or 2	Edema and erythema	1	Light	Appearance of erythema and edema	d	Diffuse	
				2	Moderate		p	Ponctual	
	2	N > 2		3	Severe		peri	Peripheral	

Table 2. Parameters evaluated for hair and nails.

Parameters – Hair and Nails							Answers
1	Have you noticed your nails are more resistant?						Y = Yes N= No
2	Did you think the product improved the general appearance of your nails?						
3	Did you notice that there was a reduction in hair loss?						
4	Have you noticed your hair is thicker and more resistant?						
5	Have you noticed a reduction in damaged hair strands?						
6	Did you think the product improved the general appearance of your hair?						
7	Did you like the product?						
8	Would you buy the product?						

Participant opinion questionnaire (cosmetic appreciability)

Participants were instructed to answer a questionnaire on D90 and D180 containing the questions listed in table 2.

Results

The main results are shown in the tables below:

Table 3. Main collagen markers

N. of included participants	51	N. of participants that finalized the study	50
N. of participants dropping out	1	Reason	Did not return for personal reasons
N. of excluded participants	0	Reason	N/A

Table 4. Main placebo markers

N. of included participants	51	N. of participants that finalized the study	51
N. of participants dropping out	0	Reason	N/A
N. of excluded participants	0	Reason	N/A

Dermatological acceptability

No participant reported feelings of discomfort and no clinical signs were detected after applying the product.

Cosmetic Appreciability (Participants' Opinion)

The results obtained are shown in Graphs 1 and 2, which represent the percentages of participants for each answer to the questions presented in the cosmetic appreciability questionnaire applied after 90 and 180 ± 2 days of product use.

After 90 days of using the product, among participants who completed the survey:

- Have you noticed your nails are more resistant?
- 80% of people who used the CCG Type product agree, compared to 47% who used the CMT Type.
- Did you think the product improved the general appearance of your nails?
- 78% of people who used the CCG Type product agree, compared to 67% who used the CMT Type.

- Did you notice that there was a reduction in hair loss?
- 68% of people who used the CCG Type product agree, compared to 33% who used the CMT Type.
- Have you noticed your hair is thicker and more resistant?
- 68% of people who used the CCG Type product agree, compared to 47% who used the CMT Type.
- Have you noticed a reduction in damaged hair strands?
- 78% of people who used the CCG Type product agree, compared to 55% who used the CMT Type.
- Did you think the product improved the general appearance of your hair?
- 94% of people who used the CCG Type product agree, compared to 55% who used the CMT Type.
- Did you like the product?
- 100% of people who used the CCG Type product agree, compared to 63% who used the CMT Type.
- Would you buy the product?
- 96% of people who used the CCG Type product agree, compared to 63% who used the CMT Type.

After 180 days of using the product, among participants who completed the survey:

- Have you noticed your nails are more resistant?
- 88% of people who used the CCG Type product agree, compared to 47% who used the CMT Type.
- Did you think the product improved the general appearance of your nails?
- 82% of people who used the CCG Type product agree, compared to 65% who used the CMT Type.
- Did you notice that there was a reduction in hair loss?
- 78% of people who used the CCG Type product agree, compared to 47% who used the CMT Type.
- Have you noticed your hair is thicker and more resistant?
- 88% of people who used the CCG Type product agree, compared to 51% who used the CMT Type.
- Have you noticed a reduction in damaged hair strands?
- 88% of people who used the CCG Type product agree, compared to 51% who used the CMT Type.
- Did you think the product improved the general appearance of your hair?

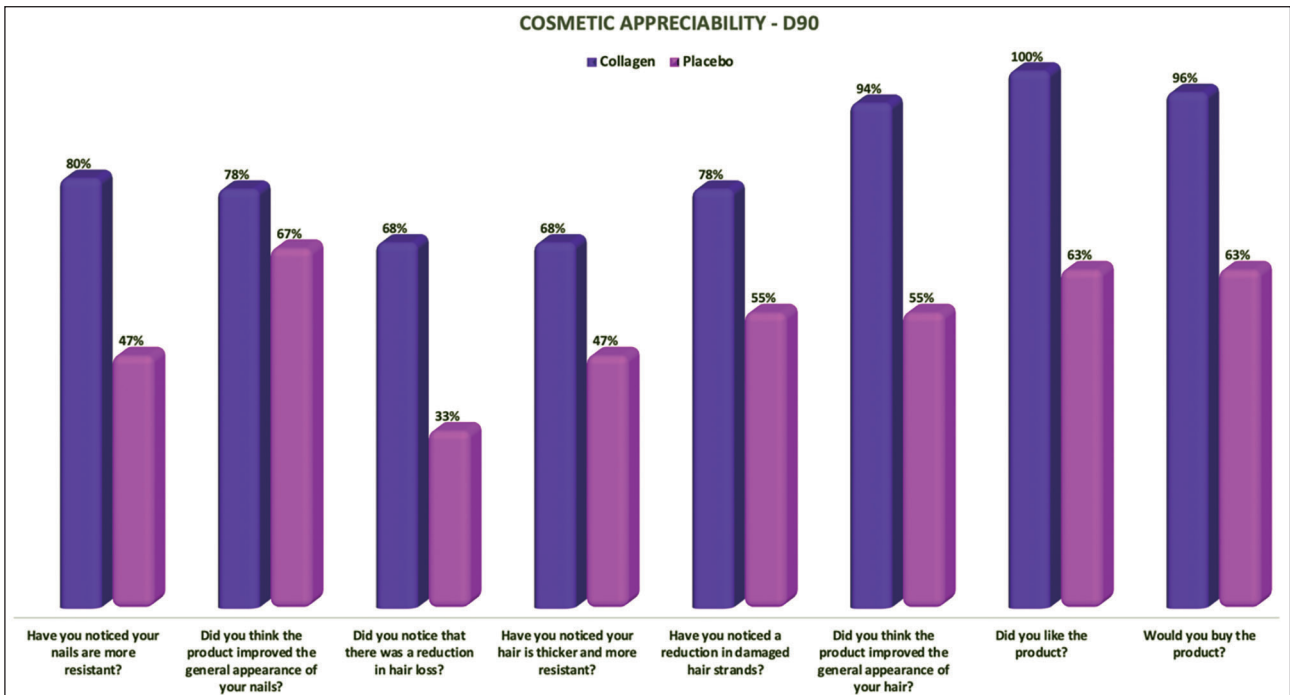


Figure 1. Participants' responses to the cosmetic appreciability questionnaires applied after 90 ± 2 days of product use (Part 1)

- 94% of people who used the CCG Type product agree, compared to 49% who used the CMT Type.
- Did you like the product?
- 100% of people who used the CCG Type product agree, compared to 67% who used the CMT Type.
- Would you buy the product?
- 98% of people who used the CCG Type product agree, compared to 61% who used the CMT Type.

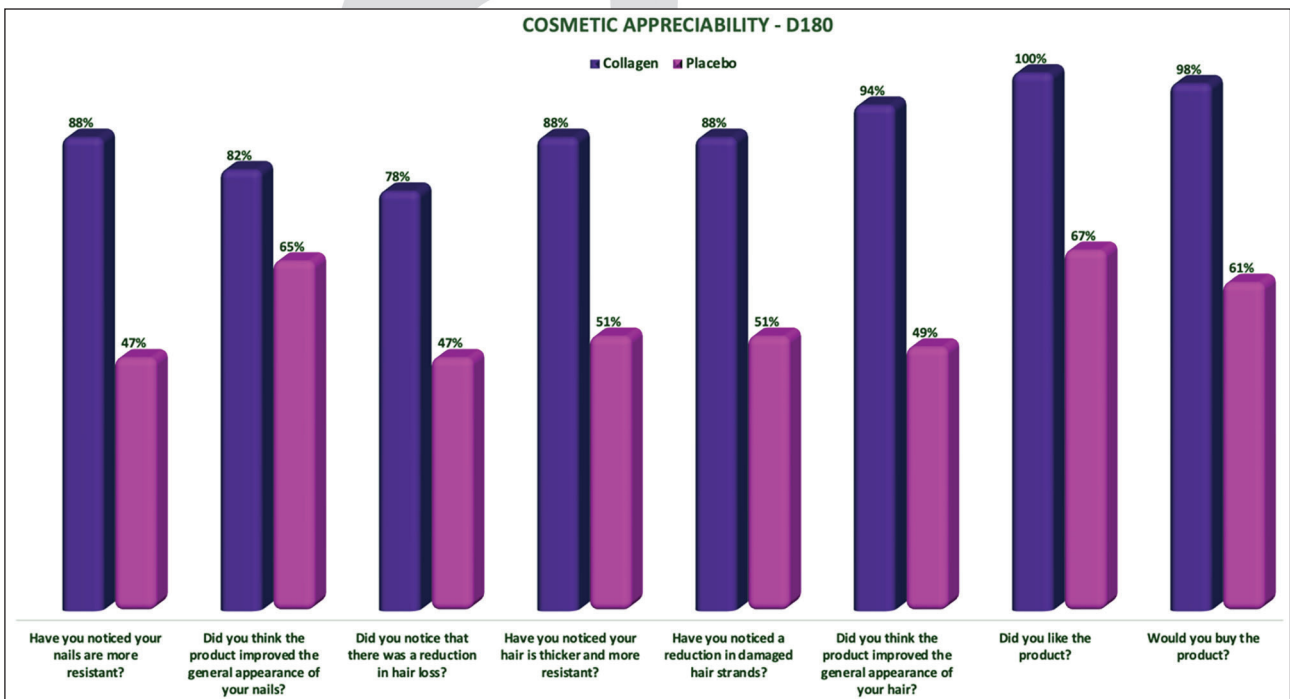


Figure 2. Participants' responses to the cosmetic appreciability questionnaires applied after 180 ± 2 days of product use (Part 2)

Conclusion

GelcoPEP supplementation showed positive effects in relation to skin aesthetic criteria, especially hydration, also covering criteria such as elasticity, reduced appearance of expression lines and wrinkles and reduction in the degree of cellulite, as well as strengthening hair and nails, standing out as an excellent nutri-cosmetic alternative.

References

1. Baran R, Maibach HI. (ed.). *Cosmetic Dermatology*, Baltimore, Williams & Wilkins, 1994.
2. Bazin R, Doublet E. *Skin aging Atlas, volume 1 Conselho nacional de saúde. Resolução 466/12 do Ministério da Saúde. Diário Oficial, 12/12/2012.*
3. Curry AS, et al. *Safety testing guidelines. [S.l.]: Cosmetics Toiletries and Fragrance Association, 1991.*
4. Doms - Goossens A. *Cosmetics as causes of allergic contact dermatitis. Cutis. 1993; 52: 316-320.*
5. Elsner P, Merk HF, Maibach HI. (Eds.). *Cosmetics – Controlled Efficacy Studies and Regulation. Berlin, Springer-Verlag Berlin Heidelberg New York, 1999.*
6. Fisher AA. *Contact Dermatitis, 2^a edition, Philadelphia, Lea & Febiger, 1995.*
7. Kligman AM, Wooding WM. *A method for the measurement and evaluation of irritants of human skin. J. Invest. Derm. 1967; 49: 78-94.*
8. Maibach HI, Marzulli FN, *Dermatotoxicology. 5th ed. [S.l.]: Taylor and Francis, 1996.*
9. Sampaio SAP, Rivitti EA. *Dermatologia Básica, 2^a edição, São Paulo, Artes Médicas, 2000.*
10. *Scientific committee on cosmetic products and non-food products. Notes of guidance for the testing of cosmetic ingredients and their safety evaluation. 5th ed. [S.l.], 2003; 102: (SCCNFP/0690/03 Final)*

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Rarely Diagnosed Massive Pulmonary Thromboembolism – A Case Study Presentation

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Abstract

Intensive care medicine treatment is multidisciplinary and multi-professional treatment, and represents the highest level of medical care. It is performed in intensive care settings, special work units, where special methods and procedures are performed by anesthesiology and resuscitation specialists, intensive care medicine subspecialists, using special equipment and drugs. In the paper we present case of 67-old male patient, hospitalized at our, previously surgical, now central, polyvalent Intensive care unit during two-month period. After extended surgical procedures, he was diagnosed with massive pulmonary thromboembolism. Due to applied complex intensive care treatment, patient health condition gradually improved.

The highlight of this case study presentation was to characterize relationship between massive pulmonary thromboembolism, after extended surgical procedures, and prophylaxis with low-molecular weight heparin. On 65th day of hospitalization patient was fully recovered and transferred to the Clinic of Abdominal Surgery, and later discharged home.

Keywords: bleeding ulcer, surgery, ICU, pulmonary thromboembolism

1. Introduction

Critically ill patients after extended surgical procedures are at high risk for postoperative complications. Pulmonary and infectious complications are major cause of postoperative morbidity and mortality in surgical critical care (1,2). Pulmonary thromboembolism (PTE) is a life-threatening

condition or complication and might be one of the worst nightmares for most surgeons and intensive medicine subspecialists. The embolus, that causes obstruction of the pulmonary blood vessel, usually travels through the venous system from a distant site. Pulmonary thromboembolism causes symptoms such as dyspnea, chest pain or collapse (1). Moreover, the clinical severity of PTE can vary, ranging from asymptomatic cases to sudden death. Surgical patients usually show a postoperative acute-phase response typically lasting for 48 up to 96 h after the surgical procedure (1). If the acute-phase response persists for longer than 96 h, or a secondary occurrence of symptoms after the primary resolution takes place, an infection is likely to be the reason. Standardized treatment protocols including supportive and adjunctive therapy and the use of modern anti-infective agents may lead to a decrease in postoperative mortality (2).

Intensive care medicine treatment is multidisciplinary and multi-professional treatment, and represents the highest level of medical care. It is performed in special work units, where special methods and procedures are performed by anesthesiology and resuscitation specialists, intensive care medicine subspecialists, using special equipment and drugs. Working in the intensive care unit represents the science and skill of detecting and working with patients who are in critical condition, and the task is to prevent the deterioration of the patient's condition and achieve the best possible outcome for the patient. In the paper we present case of 67-old male patient, hospitalized at our, previously surgical, now central, polyvalent Intensive care unit during two-month period.

2. A case study presentation with discussion

Because of bleeding ulcer patient was admitted at Clinic of Gastroenterology. After endoscopy performed by gastroenterologist, the next day patient was transferred to Clinic of Abdominal Surgery for further treatment. Third day of hospitalization patient suddenly collapsed, hemodynamically unstable with signs of bleeding, so urgent gastroscopic hemostasis was done and patient was transferred to central, polyvalent Intensive care unit. After extended surgical procedures, patient was extubated in the Intensive care unit. During the night there was a deterioration of his health condition, clinically manifested hypotension, tachycardia with a drop in oxygen saturation (SpO_2), so he was sedated, intubated and mechanically ventilated, with continued intensive care treatment and monitoring of vital clinical signs and laboratory findings. He was critically ill patient. Massive pulmonary thromboembolism was noted at urgently performed computed tomography (CT) of chest, and dose of low molecular weight heparins was increased. After another complex surgical procedures, that were performed because of surgical wound dehiscence, his condition remained critical. On 35th day surgical *tracheotomy* was performed as prolonged mechanical ventilation was expected. Due to applied complex intensive care treatment, patient health condition gradually improved: he was „weaned“ from ventilator, later tracheoflex was removed. Control chest X-ray showed regression of intrapulmonary changes and pleural effusions. On 65th day of hospitalization patient was fully recovered and transferred to the Clinic of Abdominal Surgery, and later discharged home.

Common general postoperative complications include postoperative fever, atelectasis, wound infection, embolism and deep vein thrombosis (DVT). Pulmonary thromboembolism (PTE) is a life-threatening condition or complication and might be one of the worst nightmares for most surgeons and intensive medicine subspecialists. The embolus, that causes obstruction of the pulmonary blood vessel, usually travels through the venous system from a distant site. Pulmonary thromboembolism (PTE) causes symptoms such as dyspnea, chest pain or collapse (1). Moreover, the clinical severity of PTE can vary, ranging from asymptomatic cases to sudden death.

Despite advances in diagnosis and treatment, pulmonary thromboembolism (PTE) remains a significant cause of morbidity and mortality and is still one of the most common preventable causes of death (1,2). Risk factors for deep vein thrombosis (DVT) and pulmonary thromboembolism (PTE) are previous medical history of DVT or PTE, recent surgery, general anesthesia lasting longer than 30 min, pregnancy, prolonged immobilization, age > 40 years, obesity or underlying malignancy (3,4). Pulmonary thromboembolism is third most common cause of death in the US, with at least 650000 cases occurring annually (5, 6). Furthermore, pulmonary thromboembolism represents the first or second most common cause of unexpected death in most age groups. The highest incidence of recognized PTE occurs in hospitalized patients. The annual incidence of known deep vein thrombosis (DVT) and pulmonary thromboembolism (PTE) in the Western world is 1.0 and 0.5 per 1000, respectively. There are 65000 cases each year among hospital patients in England and Wales (1,3).

Surgical patients have long been recognized to be at special risk for deep vein thrombosis (DVT) and pulmonary thromboembolism (PTE), but these problems are not confined to surgical patients. Surgeons should always suspect pulmonary thromboembolism (PTE) in case of a sudden circulatory collapse occurring within one to two weeks after surgery (1). Anticoagulant prophylaxis is effective in preventing PTE in hospitalized patients, since it reduces mortality after surgery (3). Prophylaxis with low-molecular weight heparin (LMWH) leads to effective reductions in the incidence of deep vein thrombosis (DVT) after abdominal surgery in patients at risk for thromboembolic complications. Preoperative prophylaxis for deep vein thrombosis is important, but further research is needed to estimate its effects and benefits (6). In our case, older age (> 60 years) was identified to be a risk factor for pulmonary thromboembolism. As the mortality from pulmonary thromboembolism depends on correct and timely diagnosis, it is of the utmost importance for clinicians to consider this possibility and perform proper diagnostic tests, especially in patients with colorectal cancer.

Electrocardiography helps identify patients at risk of adverse outcomes in acute pulmonary thromboembolism. Abnormalities reported

with acute PTE include: sinus tachycardia, atrial arrhythmias, low voltage, Q waves in leads III and aVF (pseudo-infarction), S1Q3T3 pattern, or pattern in V₁, P pulmonale, right-axis deviation, ST-segment elevation, ST-segment depression, QT prolongation, and incomplete or complete right bundle-branch block (RBBB). Of these, sinus tachycardia, new-onset atrial arrhythmias, new right bundle-branch block (complete or incomplete), Qr pattern in V₁, S1Q3T3, negative T waves in V₁ through V₄, and ST-segment shift over V₁ through V₄ have been shown to correlate with worse short-term prognosis in acute pulmonary thromboembolism (7).

The importance of nutrition in the critically ill is increasingly acknowledged, especially in patients with long stay in the intensive care unit (ICU), who often require prolonged life-sustaining support and go through a state of severe catabolism (8). Some aspects of the nutrition practice such as the preferential use of the early oral/ enteral nutrition (EN) over «gut rest» and the acceptance of delaying provision of amounts of nutrients calculated to match the losses and expenditure. Further, most recent guidelines recommend that EN is started within 48h of admission after stabilization and progressed to target over 3–4 days. Critically ill patients are often admitted with a nutritional deficit developed in the days preceding ICU admission.

Critically ill patients after extended surgical procedures are at high risk for postoperative infections. Surgical patients usually show a postoperative acute-phase response typically lasting for 48 up to 96h after the surgical procedure (9). If the acute-phase response persists for longer than 96h, or a secondary occurrence of symptoms after the primary resolution takes place, an infection is likely to be the reason. Common causes of intra-abdominal infections (IAI) in patients in intensive care units are perforations of the upper gastrointestinal tract secondary to ulcer disease or of the lower gastrointestinal tract secondary to diverticular disease or cancer. Gut ischemia due to arterial embolism, thrombosis or arterial vascular disease as a cause of peritonitis is predominantly seen in elderly patients. After previous abdominal surgery, an anastomotic leakage, an intra-abdominal abscess, or inadvertent and undetected injury of the bowel could be the reason of further abdomi-

nal sepsis (10). Bacterial or fungal intra-abdominal infections in critically ill patients are mostly acquired as complications of previous elective or emergency surgery. These infections are caused by a wide spectrum of pathogens, which are dependent on the site of operation and on specific hospital and intensive care unit conditions (10).

3. Conclusion

The highlight of this case study presentation was to characterize relationship between massive pulmonary thromboembolism, after extended surgical procedures, and prophylaxis with low-molecular weight heparin. On 65th day of hospitalization patient was fully recovered and transferred to the Clinic of Abdominal Surgery, and later discharged home.

References

1. Idiz M, Konuralp C, Ates M. Under diagnosis of pulmonary embolism: a recurrent nightmare for surgeons. *Eastern J Med* 2003; 8: 1-6.
2. Wolfe TR, Hartsell SC. Pulmonary embolism: making sense of the diagnostic evaluation. *Ann Emerg Med* 2001; 37: 504-514.
3. Robinson GV. Pulmonary embolism in hospital practice. *BMJ* 2006; 332: 156-160.
4. McAlister FA, Bertsch K, Man J, Bradley J, Jacka M. Incidence of and risk factors for pulmonary complications after nonthoracic surgery. *Am J Respir Crit Care Med* 2005; 171: 514-517.
5. Heit JA. The epidemiology of venous thromboembolism in the community: implications for prevention and management. *J Thromb Thrombolysis* 2006; 21: 23-29.
6. Sakon M, Kakkar AK, Ikeda M, Sekimoto M, Nakamori S, Yano M, Monden M. Current status of pulmonary embolism in general surgery in Japan. *Surg Today* 2004; 34: 805-810.
7. Kerkez M, Čulaić Đ, Mijač D, Ranković V, Lekić N. A study of pulmonary embolism after abdominal surgery in patients undergoing prophylaxis. *World J Gastroenterol* 2009; 15(3): 344-348.
8. Marshall JC, Innes M: Intensive care unit management of intra-abdominal infection. *Crit Care Med* 2003; 31: 2228–2237.

9. Solomkin JS, Mazuski JE, Baron EJ, Sawyer RG, Nathens AB, et al. Guidelines for the selection of anti-infective agents for complicated intra-abdominal infections. *Clin Infect Dis* 2003; 37: 997–1005.
10. Sartelli M, Abu-Zidan FM, Catena F, Gri ths EA, Di Saverio S, Coimbra R, et al. Global validation of the WSES Sepsis Severi- ty Score for patients with complicated intra-abdominal infections: a prospective multicentre study (WISS Study). *World J Emerg Surg* 2015; 10: 61.

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Behavioral and communication determinants of adolescents in the Tuzla Canton area in predicting bullying

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Abstract

Introduction: Involvement in bullying no matter of the role, seems to compromise the healthy development of children and adolescents. It is a complex phenomenon that is of public health importance because it is widespread and preventable if intervened on time.

Material and Methods: The prospective study included 1501 adolescents aged 11 to 16, and 49 eighth and ninth grade elementary school teachers. The Strengths and Difficulties Questionnaire- SDQ was used to assess symptoms of behavioral and communicational skills grouped into five scales: prosocial behavior, hyperactivity, emotional problems, behavioral problems, and problems with peers.

Results: There is a significant difference in teachers 'and adolescents' perceptions of behavioral disorders, emotional problems, peer problems, hyperactivity, and prosocial behavior. Adolescent emotional symptoms have the strongest predictive significance for future behavior.

Conclusion: The general conclusion is that all aspects of bullying examined are significant predictors of future behavior other than prosocial behavior. It is necessary to develop a support system and to act preventively through adequate programs.

Key words: adolescents, bullying, behavioral problems,

1. Introduction

The adolescent period is characterized by pronounced social interaction. Spatially, the place where such interaction takes place most intensively is the school. The dynamics of peer interaction have their characteristics, and one of the negative phenomena of that dynamic it also involves peer violence. There are various forms in which peer violence occurs, which overlap with the division into different forms of aggression. Many are definitions of and the operationalization of the term peer violence that seeks to delineate, emphasize, and treat particular aspects of this public health problem. In practical use is bullying which in a certain way it integrates many of the common characteristics of all deviant peers a relationship that has a common characteristic of aggression.

One common form is direct aggression, which can be in the form of physical or verbal aggression (1). Besides, to direct, there are acts of aggression where the aggressor is not always clearly visible, that is, aggression occurs in a covert, indirect form (2). It manifests itself in gossip, spreading rumors and social isolation of the victim.

In addition to various forms, peer violence can also be seen as a form of social interaction in which participants take on different roles. Among the direct participants in the situation of violence in most Empirical studies (3,4) distinguish three roles: the bully, passive victim, and abuser-victim (provocative or aggressive victims). The operationalization of violence through the roles they en-

gage in violent interaction is particularly prevalent in research predictors, characteristics, and effects of peer violence.

Most of the determinants of empirical research on violence are cited three criteria that must be satisfied to be classified as an aggressive act bullying: intent, repetition and disproportionate power. Olweus defines bullying as a situation of disproportionate power in which the victim is repeatedly and intentionally exposed to aggressive acts (physical harm and/or intimidation) of one or more persons (5). Although disproportionate to the power that it exists between the victim and the abuser emphasizes as an important element in many definitions bullying/bullying (6), in every act of peer violence does not have to there is necessarily a disproportionate power. Peer violence in general and peer violence that occurs as bullying at school, they represent more general concepts than bullying/bullying, even though they are in research is often used synonymously (7). However, Kochenderfer and Ladd views violence as a special case of peer violence in which the child is a frequent target of peer aggression (8).

Bullying involves intentional and repeated aggressive behavior, whether in form physical, verbal, electronic, written or other aggression. Physical aggression implies hitting, pushing, or tripping. Verbal aggression involves calling mock names, insulting, ridiculing, and intimidating threats on racial, sexual, national, and another basis. Spreading gossip and untruths, ignoring them, isolating them from the group, public humiliation as well uses of modern technologies (sharing pictures, leaving negative comments via SMS, e-mail, web portals, social networks, etc.) are referred to as social or relational aggression.

Aggressiveness, that is, aggressive behavior is intentional/unintentional and direct/indirect conflict that occurs in various forms (physical, verbal, social) that are common causing harm to another individual. Teasing can be both positive and negative. Positive teasing indicates closeness and attachment to another person does not elicit a distress response and strengthens the connection between the two. Negative teasing alienates, criticizes and embarrasses another person, puts them in a state of distress and reflects negatively on the connection of persons.

Because peer violence is a public health problem with far-reaching consequences for children and young people, this requires standardization, monitoring, quantitative and qualitative measurements for a purpose collecting relevant data from which preventive measures can be drawn up programs within the health care and education systems as partners in dealing with the given problem.

The study aims to screen emotional and behavioral problems of children and adolescents, self-reported by children and their teachers' perceptions through segments: prosocial behavior, hyperactivity, emotional problems, behavioral problems, and problems with peers. Based on the behavioral and communication model, predict the probability of future behavioral disorders, emotional and hyperactive disorders.

2. Material and Methods

The research is prospective. The sample included students of 8th and 9th-grade elementary schools in Tuzla Canton, as well as 49 teachers, surveyed students.

In order to screen emotional and behavioral problems of children and adolescents instrument The Strengths and Difficulties Questionnaire- SDQ was used. The questionnaire consists of 25 items grouped into five scales: prosocial behavior, hyperactivity, emotional problems, behavioral problems, and problems with peers. The scale of emotional problems assesses the presence of somatic problems associated with stress, levels of anxiety, fear, and nervousness. The scale of behavioral problems includes frequency outrage, beating with peers, stealing items at home and school, and lying.

Scale hyperactivity assesses activity level and focuses of attention. Relationships with other children in terms of a number of friends, acceptance by peers, presence of teasing, bullying and inappropriate verbal behavior were assessed by the scale of peer problems. Scale prosocial behavior is used as a scale for assessing social support and does not go into total sum. On each scale, the maximum score is 10, while the total score is 40. The instrument is coming in two versions: a scale for assessment by teachers aged 4-16 (R 4-16) and a scale for self-assessment of adolescents 11-16 years (S 11-16). The instrument assesses the degree of attendance

of a particular problem, as well as the significance of the problems related to the duration, the areas in which problems are manifested and the degree of impact on the child and his / her environment. The scale contains critical results that reflect norms that are orientational (Table 1).

Statistical processing of data will be done with the standard statistical package SPSS version 20.0, and the significance of the obtained data is defined at the level of above cut point of 0,01. First, scores were calculated on all scales of The Strengths and Difficulties Questionnaire. Pairwise Pearson's correlations was calculated between the main variables used in the study: prosocial behavior, hyperactivity, emotional problems, behavioral problems, and problems with peers. Sex differences in all research aspects were evaluated using ANOVA. Subsequently, hierarchical regression was used to predict whether the effects of prosocial behaviour were independent of the potential effect of social support compared to other behavioral and communicational aspects.

Participants

The sample was consisted of 1501 students-adolescents of both gender (50,3% male, 49,7% female; age: M=12,87; SD=0,93) as well as 49 teachers in the area of Tuzla Canton (Bosnia and Herzegovina). Data were collected using self-report questionnaires. These were distributed to stu-

dents in selected classrooms. The questionnaires included brief instructions and the experimenter who distributed them was available to answer any questions or clarify the instructions. Participation was voluntary and participants were assured that their data would remain anonymous.

3. Results

Differences in the perception of the dimensions of peer violence differ significantly ($p < 0,01$) between students and adolescents and their teachers. Adolescents estimate that they have high needs for professional assistance in the field of peer problems, but generally feel that they do not need professional help in understanding their overall difficulties. Unlike adolescents, teachers find that students have a moderate to high need for professional help as well as peer relationships. Teachers also register a moderate need to improve students' prosocial behavior, while adolescents are satisfied with their level of prosocial behavior (Table 2).

Gender differences in student and teacher self-assessment are significant. Teachers estimate that male students behavioral problems, emotional problems, peer relationships ($p < 0.01$), and hyperactivity ($p < 0.05$) significantly influence the overall difficulty score. Also, male adolescents estimate that the problem with peers negatively affects the level of prosocial behavior. In females, prosocial behavior has a significant ($p < 0.01$) positive effect

Table 1. Orientation norm for The Strengths and Difficulties Questionnaire (SDQ)

Intensity of difficulty	Strengths and Difficulties Scale					
	Emotional symptoms	Behavioral problems	Hyperactivity	Problems with peers	Prosocial behavior	Total score of difficulties
Adolescents						
No intervention needed	0-5	0-3	0-5	0-3	6-10	0-15
Moderate need for professional assistance	6	4	6	4-5	5	16-19
High needs for professional assistance	7-10	5-10	7-10	6-10	0-4	20-40
Teachers						
No intervention needed	0-3	0-2	0-5	0-2	6-10	0-13
Moderate need for professional assistance	4	3	6	3	5	14-16
High needs for professional assistance	5-10	4-10	7-10	4-10	0-4	17-40

Table 2. Descriptive statistics and ANOVA for SDQ dimensions by adolescents and teachers

Strengths and Difficulties Scale	Adolescents M (SD)	Teachers M (SD)
Emotional symptoms	2,68 (2,21)	4,82 (1,91)
Behavioral problems	1,77 (1,53)	3,67 (2,20)*
Hyperactivity	3,99 (1,45)	4,27 (1,65)
Problems with peers	4,44 (1,41)*	4,82 (1,91)*
Prosocial behavior	7,52 (1,77)	5,12 (1,46)*
Total score of difficulties	12,88 (4,41)	17,88 (3,94)

* $F_{(adolescent)} = 11,61$; $F_{(teachers)} = 4,08$

on peer problems, and the level of prosocial behavior depends on behavioral problems. Female adolescents' overall difficulty scores are influenced by emotional symptoms, behavioral problems, and peer problems ($p < 0.01$), and hyperactivity to

a lesser extent, while prosocial behavior has no significant effect on the overall impression of difficulty (Table 3).

Adolescents estimate that male students overall difficulty score depends of all domains of bullying

Table 3. Pairwise Pearson's correlations between Scales of Difficulties by teachers

Gender	Scale	Prosocial behavior	Hyperact.	Beh. problems	Emot. symptoms	Pr. with peers	Total score of difficulties
Male	Prosocial behavior	1	.051	.453**	-.050	-.436**	.041
	Hyperactivity	.051	1	.191	-.074	-.008	.311*
	Behavioral problems	.453**	.191	1	.162	-.148	.447**
	Emotional symptoms	-.050	-.074	.162	1	.294*	.383**
	Problems with peers	-.436**	-.008	-.148	.294*	1	.487**
	Total score of difficulties	.041	.311*	.447**	.383**	.487**	1
Female	Prosocial behavior	1	.051	.453**	-.050	-.436**	.041
	Hyperactivity	.051	1	.191	-.074	-.008	.311*
	Behavioral problems	.453**	.191	1	.162	-.148	.447**
	Emotional symptoms	-.050	-.074	.162	1	.294*	.383**
	Problems with peers	-.436**	-.008	-.148	.294*	1	.487**
	Total score of difficulties	.041	.311*	.447**	.383**	.487**	1

* $p < 0,05$; ** $p < 0,01$

Table 4. Pairwise Pearson's correlations between Scales of Difficulties by students

	Scale	Prosocial behavior	Hyperactivity	Behavioral problems	Emotional symptoms	Problems with peers	Total score of difficulties
Male	Prosocial behavior	1	.061	.357**	.034	-.092*	.094**
	Hyperactivity	.061	1	.314**	.146**	.097**	.491**
	Behavioral problems	.151**	.314**	1	.209**	.144**	.596**
	Emotional symptoms	.146**	.146**	.209**	1	.088*	.034
	Problems with peers	-.092*	.097**	.144**	.088*	1	.357**
	Total score of difficulties	.491**	.357**	.034	.596**	.094**	1
Female	Prosocial behavior	1	.010	.196**	.092*	-.098**	.096**
	Hyperactivity	.010	1	.238**	.127**	.086*	.407**
	Behavioral problems	.196**	.238**	1	.169**	.112**	.432**
	Emotional symptoms	.092*	.127**	.169**	1	.239**	.662**
	Problems with peers	-.098**	.086*	.112**	.239**	1	.432**
	Total score of difficulties	.096**	.407**	.432**	.662**	.432**	1

except behavioral problems. Also, male adolescents estimate that the problem with peers negatively affects the level of prosocial behavior.

In females, prosocial behavior has a significant ($p < 0.01$) positive effect on peer problems, and the level of prosocial behavior depends on behavioral and emotional problems. Female adolescents' overall difficulty scores are strongly ($p < 0.01$) influenced by all researched domains of bullying with no exception. Compared to male adolescents, female adolescent prosocial behavior serves as a protective factor in overall difficulty score (Table 4).

Impact evaluation of different benchmarks (prosocial behavior, hyperactivity, behavioral problems, emotional symptoms, problems with peers) to predict total adolescents difficulties, used hierarchical multiple regression (Table 5).

Table 5. Hierarchical Multiple Regression Analyses Predicting Total difficulties from Scales of Difficulties

Predictor	Total score of difficulties		
	ΔR^2	β	F
Step 1	.008		11.616**
Control variables ^a			
Step 2	.526**		404.801**
Prosocial behavior		0.024	
Hyperactivity		0.274**	
Behavioral problems		0.324**	
Emotional symptoms		0.464**	
Problems with peers		0.250**	
Total R ²	.659**		
n	1550		

Note.

^a Control variable included gender

* $p < .05$, ** $p < .001$.

Preliminary analyzes confirm that the assumptions of normality, linearity, multicollinearity and homogeneity were not disturbed. In first step predictors of gender experience explain about 8% of the total adolescents difficulties. Prosocial behavior, hyperactivity, behavioral problems, emotional symptoms, problems with peers (step 2), after removed the influence of gender explain the additional 52,6% of the variance ($F(6,1544) = 11,616$, $p < .001$). The entire model explained 24% of variance ($F(6,1544) = 404,801$, $p < .001$). Significant prediction of Total score of difficulties mostly

have four predictors (hyperactivity, behavioral problems, emotional symptoms, problems with peers), where emotional symptoms have a unique highest contribution ($\beta = 0,464$, $p < .001$) compared to others predictors.

4. Discussion

Experiences of violence are very common among young people. According to World Health Organizations (WHO), 10.7% of children and young people ages 11-15 report bullying. The perpetrators of violence are 10.7% and 12.6% are victims. Fewer (3.6%) children and at the same time young people have the experience of both the perpetrator and the victim of bullying. Scandinavian countries report the lowest rates of reporting peer violence (9). Friesen et al. register during the school year 39% of adolescents with experience of peer violence in a victim, 28% of perpetrators, and 13% of adolescents who were both perpetrators and victims of peer violence (10). Rigby similarly reported in his study 35% of adolescents who are daily involved in violence either as perpetrators or as victims (11). In this study we reported high need for professional intervention in behavioral problems and problems with peers.

The prevalence of peer violence perpetrators and perpetrator/victim categories is increasing in function age. Buljan- Flander et al. point out that peer violence is the most common occurrence between 10 and 14 years. In terms of gender differences, boys are more in the role of the perpetrator while the girls are more victims of violence (12). Results of this study suggest similar problems regarding gender. Usually gender differences are explained by the influence of socialization. It's for the boys inherent in expressing negative emotions such as anger, aggressive behavior, and direct confrontation, while girls learn not to show anger, avoid direct conflict and not sabotage social relations.

The perpetrators of peer violence have a positive attitude towards aggression and violence and are low self-esteem (13). Committing violence in early adolescence is a strong predictor of future deviant behavior, propensity to consume marijuana and alcohol (14). McGee et al., on the other hand, did not find any significance in their study association of victims of peer violence with anxi-

ety and depression in young adulthood, but they register experiences of rejection from peers, have lower self-esteem and are introverted. Results studies on the health consequences of adolescents are not straightforward (15). The general conclusion of the great number of studies is that youth who are perpetrators of peer violence are more externalizing behavioral problems, while victims of peer violence have to internalize behavioral problems such as anxiety, depression, and withdrawal. According to the teacher's assessment, children with experience peer violence regardless of role, are less fortunate compared to children who do not have such experience and exhibit less prosocial behavior (16).

Herraiz and Gutierrez's study identifies risk factors for peer violence in the school environment (17). Poor compliance with school rules, absenteeism and school exclusion significantly associated with the role of the perpetrator, while the amount of contact and connection with the teachers is indicated as a risk factor for the victim role. Also, the authors in their study emphasize the significance of the period in which violence is happening (17). These results are concordant with results in this study, where is registered high risk of behavioral problems, peer problems and emotional symptoms.

Adolescence as a period of turbulent changes in personality development, especially hormonal, leads to problems in emotion regulation, mood stabilization and negative affect to mechanisms of coping with stressful situations. These behaviors are described as insufficiently controlling, antisocial and excessive behaviors (18). Children with such behavior want to ignore and avoid the demands of parents or educators, they are not ready to compromise, and they can deliberately question such behavior the limits of authority. Indulgence, non-uniqueness in setting demands, setting high one's requests or indecision are some of the reasons why outsourced ones may occur behavioral patterns (19).

Internalized child behavior, or excessively controlling behavior, with characteristics of withdrawn, depressed behavior, and somatic problems, the problem is only yourself. It is problematic for the reason that it does not attract attention and is a risk of late detection.

Santalathi et al describe their behavior as a manifestation of fear, tension, shame, feelings of reluctance and sadness (20).

Hyperactivity is characterized by motor restlessness, numbness, the child cannot sit still, it cannot wait in line, and his attention can easily be impaired. It is expressed in boys and girls in a different way. Buljan-Flander et al. quote that this disorder is more common in boys and girls it is more common through less aggression and more anxiety and depression (12). In this study hyperactivity is registered only by adolescents, but not teachers. Connection with total difficulties was confirmed.

5. Conclusion

The pattern of associations among prosocial behavior, hyperactivity, behavioral problems, emotional symptoms, problems with peers underscores the importance of contextual factors to an understanding effect of bullying. The differences in perceptions of the problem of peer violence between adolescents and teachers are significant. Teachers view the problem from a global perspective as the sum of all factors, while adolescents see the causes in individual segments. Teachers estimate that students have a moderate to high need for professional help, unlike adolescents who estimate that they only need help in some segments.

References

1. Olweus, D. *Bullying or peer abuse at school: facts and intervention*, *Current Directions in Psychological Science* 1995; (4)6: 196-200.
2. Björkvist K, Lagerspetz KMI, Kaukianen A. *Do girls manipulate and boys fight? Developmental trends in regard to direct and indirect aggression*. *Aggressive Behavior* 1992; 18: 117-127.
3. Schwartz D. *Subtypes of victims and aggressors in children's peer groups*. *Journal of Abnormal Child Psychology* 2000; 28: 181-192.
4. Solberg M E, Olweus D. *Prevalence estimation of schoolbullying with the Olweus Bully/Victim Questionnaire*. *Aggressive Behavior* 2000; 29: 239-268.
5. Olweus D. *Understanding and researching bullying: Some critical issues*. In S. R. Jimerson, S. M. Swearer, & D. L. Espelage (Eds.), *Handbook of bullying in school: An international perspective*. New York and London: Routledge, 2010; 9-33.

6. Peterson L, Rigby K. Countering bullying at an Australian secondary school with students as helpers. *Journal of Adolescence* 1999; 22: 481–492.
7. Champion K, Vernberg E, Shipman K. Nonbullying victims of bullies: Aggression, social skills, and friendship characteristics. *Applied Developmental Psychology* 2003; 24: 535–551.
8. Kochenderfer BJ, Ladd GW. Peer victimization: Cause or consequence of school maladjustment? *Child Development* 1996; 67: 1305–1317.
9. Vejmelka L. Neke determinante nasilja u adolescenciji. *Ljetopis socijalnog rada* 2012; 19(2): 215-240.
10. Friesen A, Jonsson A, Persson C. Adolescents perception of bullying: who is victim? Who is bully? What can be Done to stop bullying? *Adolescence* 2005; (4)168: 750-761.
11. Rigby K. School children's perceptions of their families and parents as a function of peer relations, *Journal of Genetic Psychology*, 1993; 154: 501–513.
12. Buljan-Flander G, Durman-Marjanović z, Ćorić-Špoljar R. Pojava nasilja među djecom s obzirom na rod, dob i prihvaćenost/odbaćenost u školi. *Društvena istraživanja* 2007; 16(1-2): 157-174.
13. Olweus, D. *Aggression in the schools: bullies and whipping boys*. 1978. Washington: DC: Hemisphere.
14. Kim MJ, Catalano R, Haggerty K, Abbot R. *Bullying at Elementary School and problem behavior in Young Adulthood: a Study of Bullying, Violence and Substance Use from Age 11 to Age 21*. *Crim Behav Ment Health*; 21(2): 136-144.
15. McGee T, Mcgrath J, Williams G, O'Callaghan M, Bor V, Najman J. Young adult problem behavior outcomes of adolescent bullying, *Journal of Aggression, Conflict, and Peace Research* 2012; 32: 110-114.
16. Arsenault L, Walsh E, Trzesniewski K, Newcombe R, Caspi A, Moffitt TE. Bullying victimization uniquely contributes to adjustment problems in young children: A nationally representative cohort study. *Pediatrics* 2006; 118: 130-138.
17. Herráiz ED, Gutiérrez RB. The Health-Related Quality of Life of Students Involved in School Bullying. *Int J Sch Cogn Psychol* 2017; (4-3): 198-203.
18. Buelga S, Iranzo B, Cava MJ, Torralba E. Psychological profile of adolescent cyberbullying aggressors. *International Journal of Social Psychology* 2015; (30-2): 382-406.
19. Siess J, Blechert J, Schmitz J. Psychophysiological arousal and biased perception of bodily anxiety symptoms in socially anxious children and adolescents: a systematic review. *European Child and Adolescent Psychiatry* 2013; 23(3): 127-142.
20. Santalahti P, Aromaa M, Sourander A, Helenius H, Piha J. Have there been changes in children's psychosomatic symptoms? A 10-year comparison from Finland. *Pediatrics* 2005; 115(4): 434-442.

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Fat Embolism Syndrom As Complication of Trauma – Survey In Young Patient – A Case Study

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Abstract

Fat embolism syndrome (FES) is a recognised and potentially fatal complication of long bone fractures and orthopaedic lower limb surgery. In this paper we present a case of fit and healthy 27-year-old male trauma patient, hospitalized in critical condition at our central, polyvalent intensive care unit after extensive orthopaedic surgical procedures. Prompt extensive intensive care treatment, including supportive treatment of patient's respiratory system, continuous vital signs monitoring with laboratory and diagnostic findings, and active nutritional support, provided the positive outcome and patient was fully recovered.

Keywords: fat embolism syndrome, young trauma patient, intensive care medicine

1. Introduction

Fat embolism syndrome (FES) is a recognised and potentially fatal complication of long bone fractures and orthopaedic lower limb surgery (1). Symptoms usually occur hours to days after injury. In this paper we present a case of fit and healthy 27-year-old male trauma patient, hospitalized in critical condition at our central, polyvalent intensive care unit after extensive orthopaedic surgical procedures. An intensive care unit (ICU), also known as an intensive therapy unit or intensive treatment unit (ITU) or critical care unit (CCU), is a special department of a hospital or health care facility that provides intensive care medicine. Intensive care medicine is defined as an observational, diagnostical and therapeutical approach to the critically-ill patient, requiring specialized medical and nursing skills that cannot be met in a gene-

ral ward. Critical illness is considered as overt or threatening, potentially reversible severe organ dysfunction. Patients may be referred directly from an emergency department or from a ward if they rapidly deteriorate, or immediately after surgery if the surgery is very invasive and the patient is at high risk of complications.

2. Case study and discussion

In this paper we present a case of fit and healthy 27-year-old male patient, that was presented to the Orthopaedic Dept with traumatic femur fracture, fully conscious, respiratory and hemodynamically stable. Fifth day of hospitalisation orthopaedic surgeon performed extensive surgical procedures. There were no intraoperative complications and the patient returned to the orthopaedic ward following the procedure. A few hours postoperatively he became restless, a petechial rash was noted on the neck, developed tachypnea and tachycardia, but there was no focal neurological deficit. Pulse oximetry revealed oxygen saturations dropping to 75% on room air. Five litres of oxygen via facial mask maintained saturation at 82-83%. He was transferred to critical condition at our central, polyvalent intensive care unit. On clinical examination, his chest was clear to auscultation, his respiratory rate was 28 and he was able to speak in full sentences. A chest X-ray showed ground-glass air space disease and an arterial blood gas analysis confirmed hypoxemia. The management of trauma patients is clinically challenging and required a multidisciplinary team approach.

Prompt extensive intensive care treatment, including supportive treatment of patient's respiratory system, continuous vital signs monitoring

with laboratory and diagnostic findings, and active nutritional support, provided the positive outcome and patient was fully recovered.

Fat emboli syndrome (FES) is a potentially devastating cause of morbidity and mortality in the polytrauma patient. Firstly was identified by Von Bergman, in 1873, in a patient with fracture of the femur (2), and usually occurs as a complication of the lower extremity long bone and pelvic fractures. The other etiological factors include total knee and hip replacement, renal transplantation, sickle cell anemia, osteomyelitis, burns, severe infections, blood transfusions, diabetes mellitus, alcohol-related hepatic failure, high-dose corticosteroid therapy, chronic pancreatitis, parenteral lipid infusion, and liposuction (3, 4).

We have presented a case of young male patient with fat embolism syndrome following surgical fixation of femur fracture. It is important to make the distinction between fat embolism and fat embolism syndrome. Fat embolism is fat particles that enters the circulatory system causing vascular occlusion and subclinical phenomenon that occurs in over 90% in patients with traumatic injuries (5). Fat emboli (macro globules) can cause a more serious condition called fat embolism syndrome (FES), in which there is multisystem dysfunction. FES most commonly occurs in the second to third decade of life. The majority (95%) of cases of fat embolism syndrome occur after major trauma (6). The incidence of FES with single long bone fracture is 1-3% and with bilateral femoral fracture it has been reported in up to 33% of patients (7). Overall mortality of 5-15% has been described.

FES is an entirely clinical diagnosis. Classical triad includes symptoms in pulmonary (dyspnea), skin (petechiae) and central nervous system (mental confusion) (8). History and clinical symptoms are important for the diagnosis. Several scoring systems for diagnosing FES have been proposed over the years. The system most commonly cited in the literature is that proposed by Gurd and Wilson in 1972. After retrospective analysis of 100 patients with longbone fractures, they proposed that diagnosis of FES requires the presence of one major criteria (respiratory insufficiency, cerebral involvement, or petechial rash), four minor criteria (pyrexia, tachycardia, retinal changes, elevated ESR, fat globules in sputum, lipuria or

thrombocytopenia) and macroglobulinemia (8). In 1983, Shonfeld proposed the fat embolism index (FEI) to aid in diagnosis (9). According to this system, each clinical manifestation is given a score (petechiae = 5, alveolar infiltrates on chest radiograph = 4, hypoxemia = 3, confusion = 1, fever = 1, tachycardia = 1, tachypnea = 1) and the scores summed. A total FEI of ≥ 5 indicates FES. In 1987, Lindeque et al. proposed a set of criteria to diagnose FES on pulmonary parameters alone. According to this system, any patient with a long-bone fracture and one or more of the following could be diagnosed with FES: sustained $\text{PaO}_2 < 60$ mmHg; sustained $\text{PaCO}_2 > 55$ mmHg or a $\text{pH} < 7.3$; sustained respiratory rate $> 35/\text{min}$; or increased difficulty breathing (dyspnea, accessory muscle use, tachycardia) (10).

Our patient was diagnosed with fat emboli syndrome after fulfilling Guard and Wilson's one major and five minor criteria. These clinical signs included diffuse tachypnea with lung infiltrates, tachycardia, pyrexia, sudden anaemia, and thrombocytopenia. The most common presentation of fat emboli syndrome is hypoxia (96%), which often occurs before pulmonary symptoms develop (6). Pulmonary dysfunction occurs in 75% of FES patients, often manifesting as tachypnea, dyspnoea, cyanosis, and hypoxemia (11). The authors recommended that subclinical hypoxia, although common after long bone fracture, should be monitored closely with continuous pulse oximetry monitoring for earlier detection. Clinical symptoms and signs of fat embolism syndrome (FES) are evident hours to days after injury and are characterized by respiratory distress, altered mental status (59%), skin petechiae. Pulmonary dysfunction in the form of dyspnoea, tachypnea and hypoxemia are the primary manifestations occurring in 75% of cases (12). Ten percent of cases may develop respiratory failure and 5-8% of patients may progress to severe acute respiratory distress syndrome (ARDS) (6). Half of fat emboli syndrome patients develop severe hypoxemia and respiratory insufficiency requiring mechanical ventilation (12).

Clinical approach to patients with fat emboli syndrome includes, general patient assessment involving the traumatic situation, coordination of patient care, active nutritional support, symptomatic treatment, and adequate physical interven-

tion (5). The treatment of fat embolism syndrome is primarily supportive. As with other causes of ARDS, maintaining adequate tissue oxygenation and an arterial oxygen saturation of more than 90% should be the clinician's goal (13). The patient's lung disease might necessitate the use of positive airway pressure or even mechanical ventilation. Because many patients suffer fat embolism syndrome in conjunction with multiple trauma, general supportive measures, including hemodynamic stabilization, maintenance of normal electrolyte values, and prompt attention to orthopaedic and soft-tissue injury should be maintained.

The effects of steroids on patients with fat embolism syndrome have long been debated in the literature (14). The theoretical basis for using corticosteroids is sound; they are thought to stabilize granulocyte membranes, reduce catecholamine levels, retard platelet aggregation, inhibit the activation of complement system, and protect the capillary endothelium. Corticosteroids have been shown to reduce the incidence of fat embolism syndrome when given prophylactically in the emergency department, although data showing a therapeutic role for them once clinically apparent fat embolism syndrome has developed have remained elusive (15). However, heroically known beneficial effects of steroids includes stabilizing pulmonary capillary membrane, suppression of inflammatory response, reduction of interstitial edema, preventing activation of the complement system and has such as preventing platelet activation (2). The use of albumin in patients with fat embolism syndrome, causes a decrease in free fatty acid concentrations (2).

As a result, in patients with confusion and axillary petechial rash after bone fractures, fat embolism should be considered in the diagnosis and signs should be sought. Early diagnosis and prompt supporting treatment is important in terms of clinical course (1). It is widely accepted that the timing of fracture fixation plays a critical role in the development of fat emboli syndrome. Numerous articles confirm the finding that early fixation of long-bone fractures, within the first 24 hours after initial injury, is associated with up to a fivefold reduction in FES when compared with delayed treatment (3). Although the consensus highlights the importance of early fracture stabilisation, con-

trovery remains regarding specific methods of fixation chosen by the surgeon—i.e. intramedullary nailing (IMN) versus external fixation (EF).

In conclusion advances in technique and technology for commonly used reamer systems has facilitated the more aggressive fixation of fractures with reduced likelihood of fat embolisation and the development of fat emboli syndrome (12). Multiple studies have investigated the relationship between timing of fracture fixation and FES manifestation. Delayed stabilisation (>24 h after injury) is associated with increased incidence of pulmonary complications, increased length of stay and total healthcare costs (1).

Prevention, early diagnosis, and adequate symptomatic treatment are very important. The diagnosis of fat emboli syndrome may be complex because there are no pathognomonic signs (except for petechiae). Early suspicion combined with chest radiography and CT/ MRI brain is the key answer to diagnosis. If a patient does develop fat emboli syndrome, the standard of care consists primarily of supportive measures. This includes treatment of non-orthopaedic traumatic injuries, maintenance of oxygenation with positive pressure ventilation, aggressive resuscitation with fluids administered IV and blood products as necessary, correction of metabolic derangements and stabilization of long-bone fractures (15). Adjuvant pharmacologic treatment with corticosteroids, heparin and aspirin have been proposed. Of these, corticosteroids have demonstrated the most promise, with several trials demonstrating a reduction in fat emboli syndrome in the setting of long-bone fractures (14, 15). Corticosteroids may stabilise the pulmonary capillary membrane, thus reducing interstitial edema and the pulmonary inflammatory response. However, use, indications, dosage and timing of corticosteroids in the setting of fat emboli syndrome remain controversial.

3. Conclusion

Prompt extensive intensive care treatment, including supportive treatment of patient's respiratory system, continuous vital signs monitoring with laboratory and diagnostic findings, and active nutritional support, provided the positive outcome and this patient was fully recovered.

References

1. Hacker A, Irvine D S, MacDougal S, et al. The Development of Fat Embolism Syndrome (FES) and Multiple Small Pulmonary Emboli Following Open Reduction Internal Fixation (ORIF) of a Left Femur Fracture: A Case Report. *Cureus* 2023; 15(9): e45551. doi:10.7759/cureus.45551
2. Tanrıverdio E, Karalezli A, Senturk A, Yildirim B, Hasanoglu HC. Fat embolism: A report of three cases. *Eastern Journal of Medicine* 2013; 18: 26-31.
3. Evarts CM. The fat embolism syndrome: A review. *Surg Clin North Am* 1970; 50: 493-507.
4. Taviloglu K, Yanar K. Fat embolism syndrome. *Surg Today* 2007; 37: 5-8.
5. Kwiatt ME, Seamon MJ. Fat embolism syndrome. *Int J Crit Illn Inj Sci.* 2013; 3(1): 64-68.
6. Luff D, Hewson DW. Fat embolism syndrome. *BJA Educ.* 2021; 21(9): 322-328.
7. Shareef KA, Asadullah M, Helal M. Fat Embolism Syndrome Due to Fracture Right Femur: A Case Report. *Egyptian Journal of Hospital Medicine* 2017; 68: 923-928.
8. Gurd AR, Wilson RI. Fat-embolism syndrome. *Lancet* 1972; 2(7770): 231-232.
9. Schonfeld SA, Ploysongsang Y, Dilisio R et al. Fat embolism prophylaxis with corticosteroids. A prospective study in high-risk patients. *Ann Intern Med* 1983; 99(4): 438-443.
10. Lindeque BG, Schoeman HS, Dommissie GF, Boeyens MC, Vlok AL Fat embolism and the fat embolism syndrome. A double-blind therapeutic study. *J Bone Joint Surg Br* 1987; 69(1): 128-131.
11. Shaikh N, Ariff M Al, Ummunnisa F, Abdullah M. Post-operative Fat Embolism Syndrome: A case report and review of literature. *Qatar Medical Journal I* 2010; 19(1).
12. Porpodis K, Karanikas M, Zarogoulidis P, Kono-glou M, Domvri K, et al. Fat embolism due to bilateral femoral fracture: a case report. *Int J Gen Med.* 2012; 5: 59-63.
13. Costa AN, Mendes DM, Toufen C, et al. Adult respiratory distress syndrome due to fat embolism in the postoperative period following liposuction and fat grafting. *J Bras Pneumol* 2008; 34: 622-625.
14. Cavallazzi R, Cavallazzi AC. The effect of corticosteroids on the prevention of fat embolism syndrome after long bone fracture of the lower limbs: a systematic review and meta-analysis. *J Bras Pneumol* 2008; 34: 34-41.
15. Timon C, Keady C, Murphy CG. Fat Embolism Syndrome – A Qualitative Review of its Incidence, Presentation, Pathogenesis and Management. *Malays Orthop J* 2021; 15(1): 1-11.

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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 recommended, 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)

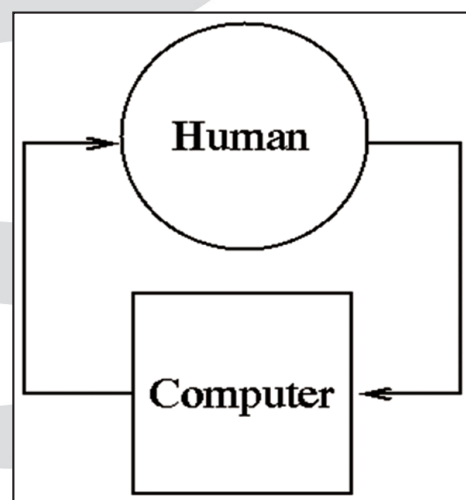


Figure 1. Text here

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.

References

1. *Sakane T, Takeno M, Suzuki N, Inaba G. Behcet's disease. N Engl J Med 1999; 341: 1284–1291.*
2. *Stewart SM, Lam TH, Beston CL, et al. A Prospective Analysis of Stress and Academic Performance in the first two years of Medical School. Med Educ 1999; 33(4): 243- 50.*

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