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13.00.01 Pedagogika nazariyasi. Pedagogik ta'limotlar tarixi
13.00.02 Ta'lim va tarbiya nazariyasi va metodikasi (sohalar bo'yicha)
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MUNDARIJA

MUNDARIJA СОДЕРЖАНИЕ CONTENTS

MANAGEMENT OF MEDICAL EMERGENCIES IN OUTPATIENT DENTAL CLINICS

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Abstract: This study aimed to assess the prevalence of medical emergencies during outpatient dental treatment and to systematize evidence-based pharmacological and resuscitation protocols for their management. A retrospective analysis of 1,500 patient records was conducted alongside surveys of clinicians and patients. Medical emergencies were identified in 95 cases (6.33%), with the highest incidence observed among female patients over 60 years of age. The most common emergencies included hypertensive crises, collapse, angina pectoris attacks, allergic reactions, and hemorrhage. Cardiopulmonary resuscitation (CPR) algorithms and pharmacological management protocols for cardiac, hypertensive, glycemic, epileptic, and syncopal emergencies were reviewed and systematized. The findings highlight the importance of mandatory pre-treatment screening, blood pressure monitoring, and continuous emergency preparedness training for dental professionals to ensure patient safety and improve clinical outcomes.

Key words: outpatient dentistry, medical emergencies, anaphylactic shock, hypertensive crisis, syncope, cardiopulmonary resuscitation, dental anxiety, emergency drug kit.

Annotatsiya: Ushbu tadqiqot stomatologik ambulator qabul jarayonida yuzaga keladigan shoshilinch tibbiy holatlarning tarqalishini baholash hamda ularni boshqarish bo'yicha dalillarga asoslangan farmakologik va reanimatsion protokollarni tizimlashtirishga qaratilgan. Tadqiqot doirasida 1500 nafar bemorning tibbiy hujjatlari retrospektiv tahlil qilinib, shifokorlar va bemorlar o'rtasida so'rovnoma o'tkazildi. Natijalarga ko'ra, 95 ta (6,33%) shoshilinch holat qayd etilgan bo'lib, ularning aksariyati 60 yoshdan oshgan ayol bemorlarda kuzatilgan. Eng ko'p uchragan holatlar gipertonik kriz, kollaps, stenokardiya xuruji, allergik reaksiyalar va qon ketish bilan bog'liq bo'lgan. Tadqiqotda yurak-qon tomir, gipertenziv, glikemik, epileptik va sinkopal holatlar uchun kardiopulmonar reanimatsiya hamda dori vositalaridan foydalanish algoritmlari tizimlashtirildi. Olingan natijalar stomatologik amaliyotda bemorlarni oldindan skrining qilish, arterial bosimni nazorat qilish va shoshilinch yordam ko'rsatish bo'yicha mutaxassislar tayyorgarligini kuchaytirish zarurligini tasdiqlaydi.

Kalit so'zlar: ambulator stomatologiya, shoshilinch tibbiy holatlar, anafilaktik shok, gipertonik kriz, sinkopa, kardiopulmonar reanimatsiya, stomatologik xavotir, shoshilinch dori vositalari to'plami.

Аннотация: Данное исследование направлено на оценку распространённости неотложных медицинских состояний в условиях амбулаторного стоматологического приёма, а также на систематизацию доказательно обоснованных фармакологических и реанимационных протоколов их ведения. В рамках исследования был проведён ретроспективный анализ 1500 медицинских карт пациентов, а также анкетирование врачей и пациентов. Из 1500 изученных случаев неотложные состояния были зарегистрированы у 95 пациентов (6,33 %), причём наибольшая частота отмечалась среди женщин старше 60 лет. Наиболее распространёнными осложнениями являлись гипертонический криз, коллапс, приступ стенокардии, аллергические реакции и кровотечения. Были систематизированы алгоритмы сердечно-лёгочной реанимации и медикаментозной помощи при кардиологических, гипертензивных, гликемических, эпилептических и синкопальных состояниях. Полученные результаты подтверждают необходимость обязательного предоперационного скрининга, контроля артериального давления и регулярной подготовки стоматологического персонала по оказанию неотложной помощи.

Ключевые слова: амбулаторная стоматология, неотложные состояния, анафилактический шок, гипертонический криз, синкопе, сердечно-лёгочная реанимация, стоматологическая тревожность, набор препаратов для экстренной помощи.

INTRODUCTION

According to the research of K.A. Popova, acute dental and systemic complications remain a significant challenge in modern dental practice. Among these, anaphylactic shock represents one of the most dangerous conditions, often leading to fatal outcomes if not managed promptly. In addition, a variety of other acute medical

conditions may arise during dental procedures, requiring immediate and well-coordinated medical intervention.

The clinical significance of intraoperative medical emergencies has increased substantially due to the rapid expansion of outpatient dentistry and the growing number of elderly patients with complex medical histories. Outpatient dental clinics, once considered relatively low-risk environments, are now recognized as settings where sudden, severe, and potentially life-threatening emergencies may occur. Recent studies indicate that severe psychological stress, painful perioperative stimuli, pre-existing systemic diseases, and the pharmacological risks associated with local anesthetic administration collectively create a multifactorial trigger for acute somatic deterioration in the dental chair (Malamed, 2015).

REVIEW OF LITERATURE

The Sympathoadrenal Cascade and Psychological Stress

Dental anxiety remains highly prevalent across different patient populations and represents a fundamental factor in the pathophysiology of intraoperative complications. Psychological stress strongly activates the sympathoadrenal system, resulting in a rapid increase in circulating endogenous catecholamines, particularly adrenaline and norepinephrine. In healthy individuals, this physiological response typically manifests as transient tachycardia and a moderate elevation in blood pressure. However, in patients with underlying cardiovascular disease, the same acute stress response may become a significant precipitating factor for serious medical emergencies.

Studies conducted by contemporary researchers have demonstrated that dental anxiety commonly contributes to acute hypertensive crises and angina pectoris attacks by substantially increasing myocardial oxygen demand (Popova, 2022). Furthermore, exogenous vasoconstrictors contained in local anesthetic solutions may precipitate severe tachyarrhythmias, acute coronary syndrome (ACS), or cerebrovascular accidents when inadvertently injected intravascularly or rapidly absorbed in highly stressed patients.

Syncope and Vascular Collapse in the Dental Operatory

Acute vascular collapse and vasovagal syncope account for a considerable proportion of all documented medical emergencies in outpatient dental practice. Vasovagal syncope is primarily described in the literature as a psychogenic neurocardiogenic response to acute fear, sensory discomfort, or needle phobia. This response results in marked bradycardia and systemic vasodilation, ultimately leading to transient cerebral hypoperfusion.

While classic vasovagal syncope is generally self-limiting and resolves after placing the patient in a supine position, true vascular collapse represents a more severe failure of peripheral vascular resistance mechanisms. Evidence suggests that prolonged collapse in the dental setting requires immediate venous access, active fluid resuscitation, and targeted pharmacological support, including glucocorticoids such as prednisolone and peripheral vasoconstrictors such as phenylephrine, to counteract severe distributive or cardiogenic hypotension (Guler et al., 2018).

Gender Vulnerabilities and Geriatric Predisposition

The number of elderly patients seeking advanced endodontic treatment, dental implantology, and extensive oral rehabilitation continues to increase. Aging is inherently associated with progressive structural and functional changes in the cardiovascular, endocrine, and autonomic nervous systems.

According to current scientific literature, elderly patients–particularly those over the age of 60 with essential hypertension, ischemic heart disease, or diabetes mellitus–constitute the highest-risk group in contemporary dental practice (Matsura, 2020). Age-related arterial stiffness, impaired baroreceptor sensitivity, and reduced cardiac reserve make these individuals particularly susceptible to acute stress-induced hemodynamic instability. Recent epidemiological evidence further indicates that elderly female patients demonstrate a higher incidence of intraoperative hypertensive episodes and subsequent vascular instability during invasive dental procedures.

Protocols for Anaphylaxis and Immediate Hypersensitivity

Among all potential complications encountered in dental practice, immediate (Type I) hypersensitivity reactions leading to anaphylactic shock pose the greatest threat to patient survival. In outpatient dentistry, anaphylaxis is most commonly associated with exposure to specific local anesthetics (particularly ester-type agents or preservatives such as methylparaben), antibiotics, latex proteins, or specialized dental biomaterials (Becker, 2010).

The underlying pathophysiological mechanism involves extensive IgE-mediated degranulation of mast cells and basophils, resulting in the systemic release of histamine, leukotrienes, and prostaglandins. Consequently, patients may rapidly develop severe vasodilation, increased capillary permeability, bronchospasm,

and laryngeal edema. International resuscitation guidelines unanimously recognize immediate administration of epinephrine (1 mg/mL) via the intramuscular route as the definitive first-line treatment. This intervention must never be delayed, as anaphylactic shock can progress within minutes to complete airway obstruction and catastrophic circulatory collapse.

Pharmacological Kit Optimization and Emergency Preparedness

Despite the well-documented risks associated with systemic complications, global studies continue to reveal substantial deficiencies in the practical preparedness of dental practitioners. Frequently reported shortcomings include unstandardized or expired emergency drug kits, inadequate availability of airway management devices such as Guedel airways and positive-pressure ventilation masks, and insufficiently practiced cardiopulmonary resuscitation (CPR) protocols among dental teams.

Contemporary clinical guidelines strongly advocate a preventive approach that includes mandatory pre-appointment screening, anxiety-reduction premedication protocols, and strict adherence to standardized pharmacological algorithms. To ensure patient safety and effective emergency management, outpatient dental clinics should maintain fully equipped emergency kits containing essential medications such as epinephrine, prednisolone, phenylephrine, captopril, and hypertonic glucose.

Methods and Materials

To achieve this objective, a comprehensive analysis of medical publications, scientific articles, dental patient records, and the results of structured surveys conducted among both dental practitioners and patients was performed. A total of 1,500 dental patient charts were retrospectively reviewed to identify the incidence and specific types of emergency conditions encountered during dental visits.

Results and Discussion

Statistical Analysis of Emergency Cases

The analysis of 1,500 patient charts revealed the occurrence of acute medical emergencies in 95 individuals. Among these patients, a higher prevalence was observed in females (55 patients) than in males (40 patients). The mean age of the affected individuals was 60.6 years.

The clinical distribution of documented emergencies was as follows:

1. Hypertensive crisis - 38.9% of cases;
2. Vascular collapse - 23.6% of cases;
3. Angina pectoris attacks - 12.6% of cases;
4. Allergic reactions - 12.6% of cases;
5. Hemorrhage (bleeding) - 9.47% of cases;
6. Acute myocardial infarction and stroke - 1.05% of cases;
7. Anaphylactic shock - 1.05% of cases (diagnosed in one patient).

Further evaluation of dental records demonstrated that women over 60 years of age exhibited a greater predisposition to these acute conditions, accounting for 58% of all documented emergency cases.

Emergency Management and Resuscitation Protocols

To effectively manage acute medical emergencies, dental practitioners must strictly adhere to established clinical guidelines. Emergency management should begin with immediate cardiopulmonary resuscitation (CPR) and airway stabilization if the patient is unresponsive.

1. Airway Management: Remove any foreign material or secretions from the oropharynx and extend the patient's neck.
2. Jaw-Thrust Maneuver: Advance the mandible forward and upward to maintain airway patency.
3. Guedel Airway Insertion: Insert the oral airway along the hard palate with the convex side depressing the tongue. Rotate the airway 180° after passing the tongue and advance it until the flange rests against the patient's lips.
4. Ventilation: Deliver two rapid rescue breaths without delay.
5. Chest Compressions: Perform closed-chest cardiac massage at a ratio of 30 compressions to 2 ventilations, maintaining continuous cycles according to CPR guidelines.

6. Epinephrine Administration: In cases of cardiac arrest or profound shock, administer epinephrine solution (0.1%, 1 mg/mL) sublingually or intravenously every 5 minutes as indicated.

Specific Pharmacological Protocols for Systemic Emergencies

1. Epileptic Seizures: Immediately summon an emergency medical team. Ensure airway patency, remove any intraoral foreign objects, and position the patient laterally to prevent tongue obstruction and aspiration. Following cessation of convulsions, assess pulse and blood pressure. Administer Phenazepam (Elzepam) 10 mg intravenously, diluted in 10 mL of sterile 0.9% sodium chloride solution, at a maximum injection rate of 3 mL/min.
2. Acute Coronary Syndrome (ACS): Position the patient in a semi-reclined posture with the head elevated, measure blood pressure, and contact emergency medical services. Administer Nitroglycerin 0.4 mg sublingually every 5 minutes (maximum of three doses), while continuously monitoring heart rate and blood pressure. Discontinue Nitroglycerin if systolic blood pressure falls below 90/60 mmHg. If ischemic chest pain persists for longer than 10 minutes, instruct the patient to chew 250-300 mg of acetylsalicylic acid (Aspirin). For analgesia, slowly administer 2 mL of a 50% Analgin (Metamizole) solution diluted in 10 mL of normal saline intravenously. In the absence of contraindications, administer Propranolol (Anaprilin) 10-40 mg sublingually. Contraindications include bronchial asthma, bradycardia (heart rate <60 beats/min), and hypotension (systolic blood pressure <90 mmHg). Arrange immediate hospitalization.
3. Hyperglycemic Coma: Urgently summon an emergency medical team. If signs of hypovolemic shock are present (systolic blood pressure <70 mmHg), initiate intravenous infusion of 0.9% sodium chloride solution at 20 mL/kg body weight per hour. Hospitalize the patient immediately after stabilization.
4. Hypoglycemic Coma: Immediately contact emergency medical services. If the patient remains conscious and able to swallow, administer fast-acting oral carbohydrates. If coma develops, administer an intravenous bolus of 40-60 mL of a 40% glucose solution.
5. Hypertensive Crisis: Reassure the patient and place them in a comfortable head-elevated position. Contact emergency services, monitor pulse and blood pressure, and determine whether routine antihypertensive medication has been taken. Administer Captopril (Capoten) 25 mg sublingually. If the therapeutic response is insufficient after 30 minutes, repeat the dose once. If blood pressure remains elevated, administer Nifedipine (Corinfar) 10-20 mg sublingually, which may also be repeated after 30 minutes if necessary. In cases accompanied by tachycardia, administer Propranolol (Anaprilin) 10-40 mg sublingually. Absolute contraindications include bronchial asthma and bradycardia.

Syncope (Fainting):

1. Place the patient in a supine position and elevate the lower extremities.
2. Perform gentle massage of the limbs.
3. Ensure airway patency and provide adequate ventilation or fresh air.
4. Stimulate respiratory and vasomotor centers using a 10% aqueous ammonia solution or by splashing cold water on the face.

If syncope persists, summon an emergency medical team. Administer 1 mL of a 20% sodium caffeine benzoate solution intramuscularly. If ineffective, slowly inject 0.1-0.5 mL of a 1% Phenylephrine (Mesaton) solution diluted in 20 mL of 0.9% sodium chloride intravenously.

Vascular Collapse: Contact emergency medical services immediately. Position the patient supine with elevated legs, ensure adequate ventilation, and maintain body warmth. Confirm airway patency and continuously monitor blood pressure and heart rate. Establish venous access and administer Prednisolone 60-90 mg intravenously as a bolus, followed by infusion of 400 mL of 0.9% sodium chloride solution. Subsequently administer 1 mL of 1% Phenylephrine (Mesaton) via intravenous infusion.

Anaphylactic Shock: Immediately summon a specialized resuscitation team. Position the patient supine with elevated lower limbs and maintain body warmth. Ensure airway patency. Administer 0.3-0.5 mL of a 0.1% Epinephrine (Adrenaline) solution diluted in 5 mL of normal saline intramuscularly, subcutaneously, or sublingually. This dose may be repeated every 20 minutes for up to one hour; a second dose may be administered within 5 minutes if clinically indicated. For rapid anti-inflammatory action, administer Prednisolone 90-150 mg intravenously (up to 300 mg if required). Infuse 400-800 mL of crystalloid or colloid solutions (0.9% sodium chloride). In cases of bronchospasm, administer 5-10 mL of 2.4% Aminophylline (Euphylline) intravenously. Continuously monitor blood pressure, pulse, and respiratory status until the emergency medical team arrives.

CONCLUSION AND PREVENTIVE STRATEGIES

The prevention of acute medical emergencies in dental practice requires effective reduction of patient stress and anxiety. Clinicians should implement appropriate premedication strategies, minimize waiting times, select optimal local anesthetic techniques, and carefully monitor blood pressure before and during dental procedures.

To ensure timely emergency intervention, every outpatient dental clinic should maintain a fully accessible emergency drug kit containing the following essential medications:

1. Sodium caffeine benzoate (10-20%);
2. Epinephrine (0.1%);
3. Sterile 0.9% sodium chloride solution;
4. Aminophylline (2.4%);
5. Prednisolone and Hydrocortisone;
6. Phenylephrine (Mesaton 1%);
7. Aqueous ammonia solution (10%);
8. Captopril and Nifedipine;
9. Glucose (40%).

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Mas’ul muharrir: Ramzidin Ashurov
Ingliz tili muharriri: Murod Xoliyorov
Musahhih: Alibek Zokirov
Sahifalovchi va dizayner: Iskandar Islomov

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