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PREFACE

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AUTHORS

MD Burak AKIN
Bağcılar Education and Research Hospital, Department of Emergency Medicine

MD İsmail BORAZAN
Etlik City Hospital, Department of Emergency Medicine

MD Seyda GEDIKASLAN
Etlik City Hospital, Department of Emergency Medicine

MD Selman GÜNDOĞAN
Bağcılar Education and Research Hospital, Department of Emergency Medicine

MD İbrahim GÜVEN
Bozuyuk State Hospital, Department of Emergency Medicine

MD Senem KOCA
Etlik City Hospital, Department of Emergency Medicine

MD Sadiye SERT
Department of Paediatrics, Konya Beyhekim Training and Research Hospital

MD Veysi SİBER
Etlik City Hospital - Emergency Medicine Clinic

MD İlker ŞİRİN
Etlik City Hospital, Department of Emergency Medicine

Chapter 1

APPROACH TO THE PATIENTS IN SHOCK

İlker ŞİRİN[1]

Introduction

Shock is a clinically characterized syndrome primarily resulting from inadequate delivery of oxygen and nutrients to tissues and organs, leading to cellular dysfunction. According to a systematic review, approximately 2% of patients presenting to the emergency department are found to have hypotension (SBP (Systolic Blood Pressure)<90 mm/Hg), and 1-2% are in a state of shock (1).

In the approach to a patient in shock, the primary objective should be early recognition and initiation of empirical treatment. While investigating the underlying cause is essential, simultaneous patient stabilization is imperative. Therefore, comprehending the stages of shock is crucial to understand the pathophysiology across all types of shock.

- **Non-progressive Stage:** The stage at which compensatory mechanisms of circulation come into play. Peripheral resistance increases, venous structures constrict, and heart activity intensifies. Coronary and cerebral blood flow are preserved by reflexes.

- **Progressive Stage:** This is the phase where shock continuously worsens, compensatory mechanisms prove inadequate, and a vicious cycle ensues, further exacerbating the shock. During this stage, there is a decrease in cardiac output due to compromised cardiac nourishment, leading to reduced arterial pressure and systemic blood flow. Inadequate tissue perfusion results from diminished cerebral and coronary blood flow. Additionally, intravascular clotting initiates, brain nourishment decreases, causing vascular dilation, and capillary permeability rises, while venous return declines. The outcomes during this phase perpetuate the same cascade, driving the system into a vicious cycle.

- **Irreversible Stage:** This is the stage where high-energy phosphate reserves are depleted, energy sources are entirely consumed, and death occurs.

[1] MD, Ankara Etlik Şehir Hastanesi Acil Tıp Kliniği, sirinilkerr@gmail.com, ORCID iD: 0000-0003-2694-5574

For a patient diagnosed with tension pneumothorax, immediate decompression is crucial. A finger thoracostomy should be performed in the fifth intercostal space before the midclavicular line, followed by tube thoracostomy.

In cases where aortic dissection or myocardial rupture has not led to pericardial tamponade, emergency intervention is required. Pericardiocentesis guided by ultrasound should be performed promptly.

In the case of cardiogenic shock due to arrhythmia, while investigating the cause of the arrhythmia, consideration should be given to cardioversion. In the presence of myocardial infarction, antiplatelet and anticoagulant medications should be initiated promptly.

For a patient in shock due to pulmonary embolism, thrombolytic therapy should be considered.

If there is suspicion of adrenal crisis, a condition that should not be forgotten among differential shock diagnoses, intravenous administration of 100 mg hydrocortisone is recommended.

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CHAPTER 2

ANEMIA AND TRANSFUSIONS OF BLOOD PRODUCTS

Selman GÜNDOĞAN[1]

Introduction

Anemia is a condition in which the erythrocyte count and hemoglobin level decrease to a level that cannot meet the physiological needs of the person. The World Health Organization (WHO) stated the hemoglobin level as 12 mg/dl for women and 13 mg/dl for men (1). Severe anemia was defined as 8 mg/dl in individuals over 5 years of age and 7 mg/dl in children under 5 years of age (2). Hemoglobin levels vary according to gender, age and race. Hemoglobin is responsible for delivering oxygen to tissues. In patients with anemia, hypoxia develops in the tissues. The heart and brain are the organs most affected by this hypoxia. The severity of symptoms seen in patients with anemia; Comorbidities are related to the rate at which anemia occurs and the loss of blood volume. Shortness of breath, fatigue, and weakness that occur with exertion occur before other symptoms. Pallor may be observed in patients (3,4).

Morphological Classification of Anemias

According to the morphology of erythrocytes, they are evaluated as macrocytic, normocytic and microcytic. Classification is made according to mean corpuscular volume (MCV) value (5). MCV below 80 fl is called microcytic, over 100 fl is called macrocytic, and between these two values is called normocytic (6). Anemia classification according to erythrocyte morphology is summarized in Table 1.

Transfusion

The primary objective of blood transfusion, classified as a form of organ transplantation, is to restore the deficient component. Whole blood refers to blood that has not undergone any separation into its constituent components. Blood products are generated using a variety of procedures that are applied to whole

[1] MD, Bağcılar Education and Research Hospital, Department of Emergency Medicine, selman.gundogan26@gmail.com, ORCID iD: 0000-0001-9795-8087

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CHAPTER 3

ANEURYSMAL SUBARACHNOID HEMORRHAGE

Seyda GEDIKASLAN[1]

Introduction

Subarachnoid hemorrhage (SAH) refers to life-threatening bleeding in the subarachnoid space between the arachnoid mater and the pia mater. Although the incidence of SAH varies by region, the worldwide incidence is 9 per 100,000 person-years (1). SAH accounts for 5% of all strokes (2). The causes of SAH are summarized in Table 1. It can occur spontaneously or as a result of trauma. Approximately 85% of spontaneous SAH cases are attributed to aneurysms, while the remaining cases are associated with non-aneurysmal perimesencephalic bleeding, arteriovenous (AV) malformations, amyloid angiopathies, cerebral arterial vasculitis, tumors, anticoagulant use, and cocaine use (1).

Table 1: Causes of Subarachnoid Hemorrhage
Trauma
Spontaneous a) Aneurysmatic Subarachnoid hemorrhage b) Nonaneurysmal perimesencephalic hemorrhage c) Arteriovenous malformation d) Amyloid angiopathy e) Cerebral artery vasculitis f) Tumors g) Anticoagulant drugs h) Cocaine use

Aneurysmal subarachnoid hemorrhage (aSAH) is a fatal condition, with prehospital mortality rates ranging from 22% to 26%, and in-hospital mortality rates around 19% to 20% (3). Risk factors for the development of intracranial aneurysms include female gender, black race, smoking, chronic alcohol use, hypertension, family history, and inherited diseases such as autosomal dominant

[1] MD, Etlik City Hospital, Department of Emergency Medicine, gedikaslanseyda@gmail.com, ORCID iD: 0000-0001-6420-6444

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CHAPTER 4

APPROACH TO DEHYDRATION IN CHILDREN

Sadiye SERT[1]

Introduction

Dehydration due to gastroenteritis in children is a common condition. Paediatricians can assess the extent of dehydration through a history and physical examination. The severity of electrolyte imbalances and dehydration may be assessed using the results of laboratory tests conducted on a sample of severe cases. The first choice should be oral rehydration solution when a child can be fed orally and has just mild dehydration. Severe dehydration in infants can be deadly or very morbid. In order to restore the whole fluid deficit in severe situations, it should be treated straight soon via parenteral route. Dehydration in children has a good prognosis when properly treated.

Definition

Dehydration is a condition characterized by a significant loss of body water (1). As for volume depletion or hypovolemia, it refers to a decrease in circulating volume. However, they are often used interchangeably. While dehydration accompanies hypernatremia, water and salt loss may occur in hypovolemia (2).

Etiology

The most typical cause of dehydration in children is diarrheal disease. Dehydration is linked to several other paediatric diseases. Dehydration can also result from the flu, gingivitis, urinary tract infections, and certain bacterial infections (2-4). Water deficiency (i.e., diabetes insipidus), increased insensible losses, inadequate fluid intake, and water and salt deficiencies are other causes of dehydration (1, 3, 5).

[1] MD, Department of Paediatrics, Konya Beyhekim Training and Research Hospital sadiyesert@yahoo.com.tr
ORCID iD: 0000-0002-1394-935X

At the end of the rehydration period, both hypernatremia and hyponatremia have usually resolved.

When the hydration status is re-evaluated at the end of 4 hours, if there are signs of dehydration, the volume deficit is completed and then the maintenance phase is started. Replacement of losses with continued stool and vomiting can be achieved with an ORS. Oral ondansetron (0.15 mg/kg) can be administered to reduce vomiting (39). During this phase, ORS or breast milk, undiluted lactose-free formula and other appropriate nutrients can be given (3, 5).

Intravenous Rehydration

Intravenous fluid therapy is required for patients who are unresponsive, unable to swallow, suffering from paralytic ileus, severe hypovolemia, or abnormal electrolytes (8). Most dehydrated children can be properly rehydrated without resorting to intravenous therapy. Severe cases should first be treated with parenteral fluids via intravenous route or, if indicated, via intraosseous route (40). While seeking the parenteral route, a nasogastric infusion of ORS (30 mL/kg/hr) can be managed provided airway protective reflexes are not impaired. Patients treated via parenteral route should be given rapid boluses of 0.9% sodium chloride (20 mL/kg) for not more than 20 minutes. In particularly severe cases, it is not uncommon for patients to require 60 to 100 mL/kg before restoration of circulatory volume becomes apparent. If the child is conscious and has good respiratory protective reflexes, enteral fluid therapy with an oral or nasogastric tube can be started immediately (35, 38). Use of hypotonic fluids during the maintenance phase of intravenous replacement may cause iatrogenic hyponatremia (3, 41).

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CHAPTER 5

ACUTE ABDOMINAL PAIN

İbrahim GÜVEN[1]

Introduction

Acute abdominal pain is defined as abdominal pain with an onset of less than one week, with symptoms concentrated in the abdomen in patients with no known abdominal trauma and, for female patients, a gestational age of less than 20 weeks (1).

It is one of the most common (5-10%) causes of emergency department visits, and the cause is unknown in 42% of cases (2). Hospitalization rates for patients presenting with abdominal pain to the emergency department range from 20% to 40% (3). This rate is higher (60%) in the elderly population (4).

Abdominal pain can be classified neuroanatomically into three categories: Visceral pain, parietal pain, and reflected pain (5,6,7):

Visceral Paina

Visceral pain results from irritation of the visceral peritoneum, which is innervated by autonomic nerves. It is often caused by distention of intra-abdominal organs and muscle contractions. The pain is typically dull, uncomfortable, and poorly localized. Since the fibers innervating the visceral peritoneum are segmentally distributed, visceral pain is localized by the sensory cortex. In addition, due to bilaterally innervated intraperitoneal organs, stimuli are relayed to both sides of the spinal cord. This is why visceral pain is felt in the midline, regardless of the anatomical location of the organ.

Parietal Pain

Parietal pain occurs when the parietal peritoneum is stimulated, such as when an inflamed organ comes into contact with the parietal peritoneum. The parietal peritoneum is innervated by somatic nerves, so this pain is also known as somatic

[1] MD, Bozuyuk State Hospital, Department of Emergency Medicine, dr.guven.86@gmail.com, ORCID iD: 0009-0001-0662-3001

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Chapter 6

CURRENT APPROACH TO KIDNEY STONE DISEASES IN THE EMERGENCY DEPARTMENT

Burak AKIN[1]

Introduction

The primary focus of emergency medicine management involves the alleviation of pain, evaluation of renal function, and assessment of the probability of spontaneous passing of urinary stones. The occurrence of this phenomenon is influenced by various factors including geographic location, cultural background, dietary habits, and genetic predisposition. The condition has a global prevalence of approximately 20% and exhibits a recurrence rate of 50% (1).

The prevalence rates for renal calculi in the United States are reported to be 11% in men and 7% in women. Furthermore, the incidence of kidney stones has shown a consistent increase across all age groups and genders (2). Approximately 70% of ureteral calculi cases are observed in adults between the ages of 20 and 50 years, with a higher incidence recorded in regions characterized by hot or arid climates.

Pathophysiology

The process of stone production necessitates the presence of a state of supersaturation in the urine, wherein dissolved ions exceed their solubility limit and then precipitate into a solid phase. Enhancing the volume of solvent (urine) while reducing the quantity of solute substances (such as uric acid, calcium, oxalate) sent to the renal system can contribute to preventive measures. Certain chemicals, such as citrate and magnesium, have the ability to impede the process of crystal precipitation and the subsequent production of stones.

Approximately 80% of calculi consist of calcium oxalate, calcium phosphate, or a mix of the two. Conditions such as immobilization syndrome, hyperparathyroidism, absorptive and renal hypercalciuria are associated with

[1] MD., Bağcılar Education and Research Hospital, Department of Emergency Medicine, burakakin3232@hotmail.com, ORCID iD: 0000-0003-2515-5482

and AUA for getting rid of distal ureteral stones when there is no reason to do surgery right away.

Most of the time, opiate painkillers are used to treat pregnant patients because NSAIDs are not safe for them (20). Since nifedipine is safe to use during pregnancy, it has been suggested as a MET for pregnant women (20), but its effectiveness in the general population has been questioned (21). The safety of alpha blockers during pregnancy is not known.

Conclusion

The three main factors that can be used to forecast the successful transit of stones without the requirement of surgical intervention are the size of the calculus, its location, and the level of discomfort experienced by the patient. The primary determinant influencing the successful transit of a calculus through the genitourinary tract is its size. Calculi measuring less than 5 mm in diameter have a 90% probability of spontaneous passage within a four-week timeframe.

However, not every patient with renal colic needs imaging. Imaging is recommended when a high-grade obstruction is suspected, or when the symptoms are not typical, the diagnosis is uncertain, the patient has a single kidney or a kidney transplant, or if the patient appears toxic.

Patients who apply to the emergency department with kidney stones should be diagnosed quickly and should be reassured immediately. Meanwhile, differential diagnoses that can be fatal should not be overlooked.

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CHAPTER 7

CURRENT MANAGEMENT OF ACUTE CHOLECYSTITIS IN EMERGENCY

Burak AKIN[1]

Introduction

Acute cholecystitis is a condition that is marked by the sudden onset of inflammation in the gallbladder. Gallstones give rise to various disease conditions, such as acute calculous cholecystitis, which exhibit significant variations in terms of their severity, clinical manifestation, and approaches to treatment. The prevalence of gallstones in the United States is reported to be 8% among males and 17% among females (1). The occurrence of a disease tends to rise as individuals get older and as their body mass index increases. Bariatric surgery increases the risk of developing gallstones (2). Most people with gallstones don't have any symptoms. When diagnostic imaging is being done for another reason, asymptomatic gallstones may be found. There is a 1-4% annual risk of having symptoms or complications (3).

Biliary colic is the prevailing complication related to gallstone disease. Patients frequently encounter repeated episodes of consistent upper abdominal pain, which usually endure for a brief period of time and resolve autonomously as the gallstone shifts away from its obstructive location. Acute cholecystitis can occur if the obstructing stone is left in place, causing the gallbladder to swell, become inflamed, and possibly get infected. Acute cholecystitis can become complicated by **gangrenous cholecystitis,** which is the gangrene and necrosis of the gallbladder wall. When gas-producing organisms infect a gallbladder that is already inflamed, the result is **emphysematous cholecystitis**. Perforation of the gallbladder is a rare but potentially fatal consequence of cholecystitis. Gallstones are not always necessary for the development of gangrenous cholecystitis, emphysematous cholecystitis, or perforation of the gallbladder. Gallstones in the common bile duct, also known as **choledocholithiasis,** can be either primary, meaning they

[1] MD., Bağcılar Education and Research Hospital, Department of Emergency Medicine, burakakin3232@hotmail.com, ORCID iD: 0000-0003-2515-5482

Although the association between bacterial infection and pathophysiology remains uncertain, it is nonetheless suggested to administer antibiotic therapy.

It is recommended to employ a combination of a third-generation cephalosporin and metronidazole, or alternatively, to utilize either a carbapenem or a β-lactamase inhibitor as standalone monotherapy.

Acalculous and emphysematous cholecystitis patients need an urgent cholecystectomy due to their higher risk of gangrene and perforation.

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Chapter 8

ELIMINATION METHODS IN THE INTOXICATED PATIENT

Veysi SİBER[1]

Introduction

As widely known, the human body eliminates various substances acquired from external sources through different mechanisms, such as urinary excretion, fecal elimination, pulmonary exhalation, and secretion expulsion. These processes are crucial for maintaining homeostasis and preventing the accumulation of potentially harmful substances.

In cases of poisoning or exposure to xenobiotics (foreign substances not naturally produced or expected to be present in the body), there are limited methods available to expedite the removal of these substances. One such approach involves enhancing the elimination process to reduce the harmful effects of the xenobiotics. By increasing the rate of elimination through various means, such as enhancing kidney and liver function, accelerating metabolic processes, or promoting enhanced excretion, the body can eliminate the toxic substances more rapidly, minimizing their adverse impact on the individual's health.

It is essential to note that these interventions should be carefully considered and administered by qualified medical professionals to ensure their effectiveness and safety, as accelerating elimination might not be suitable for all toxic substances and can potentially cause harm if not managed properly. Therefore, in cases of poisoning or exposure to harmful substances, seeking immediate medical attention is crucial for appropriate diagnosis and treatment.

In this article, our aim was to present the commonly used elimination-enhancing methods in clinical practice (Table-1).

[1] MD, City Hospital - Emergency Medicine Clinic, veysiber.ss@gmail.com, ORCID iD: 0000-0003-2856-8303

2. The Molecular Adsorbents Recirculation System (MARS) is identical to SPAD, but the albumin-enhanced dialysate (with the adsorbed xenobiotics) is itself recycled after going through another dialysis circuit and through both resin and activated charcoal cartridges.
3. The Prometheus system is a device that combines albumin adsorption with high-flux hemodialysis after selective filtration of the albumin fraction through a polysulfone filter.

The MARS system is used as a bridge for transplantation, for hemodynamic stabilization prior to liver transplantation, or as a bridge for spontaneous recovery in patients with acetaminophen-induced liver failure. One report states that acetaminophen is completely removed from the blood (11). During MARS, the acetaminophen value dropped from 40 mcg/mL to 0 mcg/ml. This makes us think that MARS improves acetaminophen clearance (12).

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Chapter 9

MANAGEMENT OF DIABETIC KETACIDOSIS IN THE EMERGENCY DEPARTMENT

Veysi SİBER[1]

Introduction

Diabetic ketoacidosis (DKA) is generally seen as a complication of patients with type 1 diabetes. It is a fatal disease that can also be seen in patients with type 2 diabetes or those with gestational diabetes. Most children with type 1 diabetes have DKA at first is a clinical finding. DKA may be the first sign of the disease in 20-25% of adult patients with type 1 diabetes (1).

Precipitating factors

The main risk factors that can lead to the development of DKA are outlined as follows:

- Newly Diagnosed Type 1 Diabetes: Approximately 20-25% of DKA cases occur in individuals with newly diagnosed type 1 diabetes. The absence of endogenous insulin secretion renders them vulnerable to metabolic derangements, leading to the onset of DKA
- Infections, including respiratory, urinary tract, and gastrointestinal infections, are common triggers for DKA. The inflammatory response associated with infections induces insulin resistance and gluconeogenesis, exacerbating hyperglycemia
- Errors in Insulin Therapy: Suboptimal insulin administration practices contribute significantly to DKA episodes. This includes insulin interruption, dose skipping, inadequate dosages, and the inadvertent use of expired insulin. The rise in blood glucose levels further promotes ketogenesis.Mistakes made during diet
- Cerebrovascular event
- Alcohol, cocaine use

[1] MD, Etlik City Hospital - Emergency Medicine Clinic, veysiber.ss@gmail.com, ORCID iD: 0000-0003-2856-8303

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Chapter 10

MARINE ENVENOMATIONS

Senem KOCA[1]

Introduction

In our country, incidents of marine creatures poisonings and injuries are rarely encountered. Due to global warming, climate change, and environmental alterations, there has been an increase in sea water temperatures, leading to the migration of toxic marine creatures from oceans to the Mediterranean Sea. An increase in organisms such as jellyfish is also observed, and it is predicted that this situation will lead to a rise in sea creatures poisoning and injury cases related to marine animals. While some countries have developed antivenoms against certain marine animal stings, there is currently no research on this topic in our country.

Toxins from venomous marine creatures are a mixture of protein and peptide toxins. The method of poisoning varies depending on the species of the organism. Poisonings can be cytotoxic, neurotoxic, myotoxic, dermatotoxic, or hematotoxic, which may result in symptoms such as pain, burning, and swelling. However, they can also lead to more severe conditions like hypertension, rhabdomyolysis, paralysis, and even death (1). Although most injuries are superficial, puncture wounds caused by certain organisms, especially sea urchins, often occur with foreign bodies and can contaminate the skin. (2)

This article will focus on poisonings caused by marine animals.

Envenomations

Stingrays and Venomous Fish

Stingrays (*Dasyatidae*, *Myliobatidae*, *Gimnuridae*, and *Rhinopteridae* families), lionfish, and scorpionfish (*Scorpaenidae* family), stonefish (*Synanceia* family), and catfish (*Ariidae*) are examples of venomous fish. They possess various mechanisms to deliver their toxins, including venomous spines on their fins and dorsal needles, toxin-secreting glandular tissues in their body spines and teeth.

[1] M.D., Etlik City Hospital, Department of Emergency Medicine, senem.ertekin@saglik.gov.tr, ORCID iD: 0000-0003-2495-782X

alternative to tetracyclines for children under 8 years old, as tetracyclines can cause permanent teeth discoloration (56).

Topical antihistamines can be used for itchiness caused by marine dermatitis. Although antivenoms are available for stonefish, box jellyfish, and sea snake stings, there is no antivenom available in Turkey. Stonefish antivenom can be used for stings from other venomous fish. Antivenoms, administered intramuscularly or intravenously, should be closely monitored due to the potential for anaphylaxis and allergy, as they are made from horse serum (57,58).

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Chapter 11

RADIATION INJURIES

İsmail BORAZAN[1]

Introduction

Exposure to radiation (irradiation) occurs when an individual is present in an environment where radioactive material is present. Unlike contamination, in irradiation, no transfer of radioactive material is observed, and it does not pose a threat to the surroundings. Contamination, on the other hand, is defined as having radioactive material externally or internally in the body, where the spread of radioactive material is observed, and it can present a hazardous situation for the surroundings. External contamination results from the penetration of radiation from the source to the skin and even deeper, while internal contamination occurs when radioactive particles are ingested or inhaled (1).

Four factors are crucial for protection from radioactivity: time, distance, protective equipment, and the quantity of radioactive material. Individuals should increase their distance from the source to reduce exposure, attempt to decontaminate the environment, minimize the time spent in the same vicinity as the source, and employ protective gear to prevent the impact of the source. Current medical treatment plays a vital role in cases of moderate to high levels of exposure (1,2).

Patients contaminated with radiological particles generally do not pose a significant risk of acute radiation dose to healthcare personnel if proper protective equipment is used, and decontamination procedures are followed. Therefore, healthcare workers should not refrain from treating conventional traumas caused by ionizing radiation or radioactive contamination. Healthcare personnel should be monitored for contamination and, if necessary, decontaminated after treatment. Patients who have been exposed only to radiation without contamination do not pose any risk to healthcare workers (3).

[1] MD, Etlik City Hospital, Department of Emergency Medicine, drismailborazan@gmail.com
ORCID iD: 0009-0003-4486-6383

technologies, adherence to safety protocols, and continuous training, medical personnel can minimize the risks associated with radiation exposure, ensuring optimal patient outcomes and the overall well-being of both caregivers and the community. As research continues to evolve and guidelines are refined, the healthcare community must remain vigilant, adaptive, and well-informed to effectively manage the challenges posed by radiation exposure in the realm of emergency medicine.

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