

**Research Article**

Cardiac Dysrhythmia is an Abnormal Heart Rhythm

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Abstract

An arrhythmia, or abnormal heart rhythm, usually means that the heart is beating too fast, too slowly, or irregularly. Few people do not feel discomfort when they notice that their heart is beating faster or irregularly or if they feel their heart pounding in their throat. Arrhythmia is an abnormal heart rhythm. The heart is controlled by a conduction system that transmits electrical impulses. This causes the heart to beat. This system works automatically, so outside of human will. The heart generally works rhythmically throughout life.

Keywords

Heart; Patients; Chest Pain; Cardiac Dysrhythmias; Health

Introduction

EMS physicians frequently use the equal technique within the discipline and the clinic to offer affected person care, despite the fact that the desires in every place differ [1]. The care of sufferers with dysrhythmias (defined as any alternate from everyday cardiac electric rhythm and frequently used interchangeably with arrhythmia) earlier than clinic arrival specializes in treating all existence-threatening or imminently existence-threatening rhythm adjustments within minutes. Precision approximately the unique rhythm alternate isn't the aim of early care, although the data won in the course of this interval can later resource that task. In the emergency branch and within the clinic, extra time is to be had to perceive the unique rhythm disturbance and titrate extra cautiously the next and eventual long-time period remedy.

Patients

All critically injured sufferers ought to have their pulse charge, blood strain, respiration charge, level of consciousness and tissue oxygenation monitored constantly [2]. Patients with an associated head harm ought to be monitored the usage of the Glasgow Coma Scale. A urinary catheter and the size of imperative venous strain offer extra valuable data for tracking resuscitation whilst

there are signs of hypovolaemia. An intra-arterial strain line is likewise very beneficial for constantly tracking the blood strain, and lets in clean sampling of arterial blood for blood gas and acid/base size.

Once blood loss is suspected, the affected person ought to take delivery of on the spot fluid alternative thru huge-bore cannulae inserted into the veins of the cubital fossae. Fluid may be given quicker thru a imperative venous catheter if this has been inserted for tracking functions and isn't contra-indicated via way of means of the presence of neck and chest injuries. One to two litres of crystalloid (normal saline) or colloid must take delivery of after sending a pattern of the affected person's blood for grouping and cross-matching. For sufferers with clean signs of surprise, request as a minimum 4 units of blood.

Patients who fail to reply to the speedy healing in their blood quantity within the absence of cardiac or principal respiration troubles, e.g. tamponade or anxiety pneumothorax, in all likelihood have extreme persevering with blood loss. In those situations the blood transfusion must be began out even as creating a speedy evaluation of the potential sites of concealed blood loss. The maximum not unusual place are the pleural or stomach cavities. Fractures of the pelvis also can motive catastrophic blood loss.

The retroperitoneum can comprise litres of blood with few external physical signs.

A speedy medical exam searching out chest dullness, stomach distension and stomach tenderness (if the affected person is conscious) must be accompanied via way of means of chest radiography, insertion of chest drains and computerized tomography (CT) scanning of the torso or peritoneal lavage wherein indicated. Properly warmed Group O Rh-negative blood or, as a remaining resort, uncross-matched blood may be given if the scenario is dire. The affected person must be transferred to an working suite as soon as the site of blood loss has been established.

Echocardiographs and electrocardiographs (ECGs) may be useful if cardiac harm or coincidental cardiac disorder is suspected. The ECG leads must be stored linked to a display for the detection of any dysrhythmias. A cardiac contusional harm must be suspected if there's vast ST section elevation or depression. Very occasionally, an emergency thoracotomy withinside the coincidence and emergency branch can be required to relieve a tamponade, to suture a penetrating wound of the coronary heart or to clamp the hilum of the lung or the descending aorta to prevent large blood loss.

Low Hemoglobin

Low hemoglobin (Hb) ranges had been related to negative medical final results in cardiac arrest sufferers [3]. Anemia is not unusualplace withinside the post-resuscitation duration and, conceivably, the oxygentransport capability of Hb can be specially vital in the course of and after international hypoxia. Previous research consequently focused on imply Hb ranges both on admission or withinside the first days after cardiac arrest and its institutions with medical consequences, however the kinetics of Hb after a hit resuscitation and their medical importance stay unknown.

During the remaining many years the post-cardiac arrest syndrome (PCAS) has been increasingly understood as a sepsis-like circumstance. Comparable to sepsis, sufferers after cardiac arrest might also additionally show dysregulated inflammation, myocardial and adrenal dysfunction, coagulopathy and a disrupted endothelial barrier feature indicating comparable pathomechanisms. However, specially the latter demands similarly investigation. Capillary leak is characterised via way of means of improved endothelial permeability main to a consecutive lack of proteins and fluid from the intravascular to the interstitial space. Biomarkers inclusive of angiopoietin-2, vascular endothelial boom issue and soluble fms-like tyrosine kinase 1, have been cautioned as indicative for endothelial permeability and have been likewise related to mortality in septic sufferers, however

might also additionally lack specificity and are often now no longer to be had in the course of habitual care.

Still, extravascular fluid loss because of missing endothelial barrier feature demanding situations treating physicians as superior fluid resuscitation and vasopressor assist are required to offer good enough cardiac output and consecutive organ perfusion. However, the volume of extravascular fluid loss stays hard to determine in vivo. With regards to PCAS, oedema formation, specially withinside the brain, is a important issue for neurologic final results.

Cocaine Use

Cocaine is the second one maximum usually used illicit drug, second only to marijuana [4]. With such vast use, ED visits associated with cocaine intoxication and its headaches have risen substantially. A latest look at suggests that 14% of people older than 12 years have attempted cocaine. Before the mid 1980s, the primary routes of management have been intranasal and intravenous injection of cocaine hydrochloride. During the 1980s, crack cocaine emerged because the shape of desire. Frequently, cocaine is blended with different capsules for numerous consequences. Examples consist of blending with heroin ("speedball") or alcohol ("liquid lady").

Cocaine reasons launch of norepinephrine, epinephrine, serotonin, and dopamine. This results in a widespread stimulatory state such as vasoconstriction and improved myocardial contractility. Cocaine additionally acts as a nearby anesthetic thru sodium channel blockade. This impact is likewise accountable for lots of the dysrhythmias and conduction abnormalities related to cocaine use.

Symptoms of cocaine intoxication consist of euphoria, feelings of power or aggression, agitation, anxiety, hallucinations (classically formication, a tactile sensation of bugs crawling at the skin), and delusions. Physical exam might also additionally monitor mydriasis, tachycardia, high blood pressure, hyperthermia, diaphoresis, tremors, or seizures. Coingestants or contaminants might also additionally bring about ordinary presentations (eg, cocaine plus heroin: blended sympathomimetic-opioid presentation).

The consequences at the cardiovascular and neurologic structures are of principal concern. Severe dysrhythmias, myocardial infarction, seizures, and subarachnoid hemorrhage might also additionally end result and doubtlessly kill the affected person. Body packers, who swallow cocaine wrapped in packets to smuggle it into the country, might also additionally die precipitously if a packet ruptures. Patients with seizures, altered mental status, dysrhythmias, or hemodynamic instability are at

improved threat of growing rhabdomyolysis, which might also additionally in flip bring about renal failure. Half of people who increase acute renal failure die.

Chest pain is a common grievance of people who gift to the ED after cocaine use. Cocaine reasons coronary vasoconstriction even as additionally growing the myocardial oxygen call for and platelet aggregation. The ED doctor ought to hold a high index of suspicion for myocardial ischemia and infarction, in spite of an ordinary records and everyday preliminary ECG; among 0.7% and 6% of those sufferers could have an acute myocardial infarction. These sufferers are commonly younger, nonwhite, cigarette people who smoke with out different threat elements for coronary artery disorder. Benzodiazepines, frequently in big doses, are beneficial in treating cocaine-induced chest ache. If acute coronary syndrome is suspected, aspirin, nitrates, and morphine are advisable. β -blockers must now no longer be used because of the threat of an unopposed α -adrenergic impact, main to improved high blood pressure and coronary vasoconstriction. Thrombolytic remedy of an acute myocardial infarction must be prevented if coronary vasospasm or dissection is suspected or extreme, out of control high blood pressure exists. Emergent coronary artery catheterization might also additionally offer the quality diagnostic data.

Chest Pain

Not all heart pain is ischemic [5]. The pain of pericarditis is commonly worse whilst recumbent, and relieved via way of means of sitting forward. ECG adjustments are frequently diffuse and can contain each precordial and limb leads. Diagnosis can be hard at first, handiest showed as soon as enzymes have excluded MI (myocardial infarction) even as widespread ECG adjustments persist. Aortic dissection might also additionally motive a tearing or reducing pain, possibly felt posteriorly withinside the chest or midback.

Although epidemiologic threat elements inclusive of smoking, own circle of relatives records, hyperlipidemias, diabetes, and high blood pressure are properly predictors of the long-time period threat of growing CAD (coronary artery disease), they're handiest minimally beneficial in discriminating among an ACS (acute coronary syndrome) and noncardiac chest ache in the intense putting. These conventional threat elements are vital to examine whilst counseling sufferers each in number one prevention and after the prognosis of CAD is established, however they must now no longer colour the assessment of a affected person who has acute chest ache.

The speedy records of chest ache ought to be received with out put off, however care must be taken to be aware clues to nonemergent reasons whose signs might also additionally first of all appear pretty much like angina. Specifically, the chest ache of a panic assault can

mimic an ACS, with substernal chest strain observed via way of means of a worry of imminent death, choking sensations, shortness of breath, palpitations, sweating, lightheadedness, tremulousness, or nausea. On the opposite hand, the paresthesias which can arise with panic are unusual with ACS, as are a worry of "going crazy," derealization (feelings of unreality), and depersonalization (emotions of being out of doors of or indifferent from oneself). Although panic assaults might also additionally arise at any age, they generally start withinside the affected person's young adults or 20s. Age of onset of signs may be useful: ACS is uncommon earlier than age 35 in guys or 45 in girls and unusual till 10 years later than that.

GERD (gastroesophageal reflux disease) can mimic angina whilst related to extreme, extended spasm of the esophageal easy muscle ("nutcracker esophagus"). Esophageal spasm may be partly relieved via way of means of nitroglycerin, furthering its mimicry of an ACS. Relief with antacids or histamine 2 antagonists additionally shows GERD, despite the fact that its absence does now no longer exclude the prognosis.

Musculoskeletal ache this is reproducible with palpation of the chest wall is a robust terrible predictor of MI (LR 0.3), mainly with the suspicion of ACS is low. Pulmonary reasons of ache might also additionally behave like musculoskeletal ache, however are extra frequently pleuritic (sharp ache worsened via way of means of breathing). Tachycardia and tachypnea related to pleuritic chest ache are purple flags for pulmonary embolism or pneumonitis.

The maximum vital a part of the bodily exam is the affected person's average appearance. If ache is gift on the time of exam, is the affected person sincerely describing a ache this is annoying, or is she or he faded and sweaty? The affected person offering with chest ache must have crucial symptoms and symptoms assessed right away and monitored carefully for adjustments in the course of the assessment. Tachycardia in particular is function of panic and pulmonary embolism (the latter specially whilst observed via way of means of tachypnea). Bradycardia, specially if new or symptomatic, might also additionally be related to inferior myocardial ischemia. Hypertension can arise as a end result of acute ache of any source, however also can be related to acute MI or, extra rarely, aortic dissection. Although a completely unusual outpatient presentation, acutely symptomatic hypotension might also additionally suggest inferior ischemia or, extra ominously, left ventricular (LV) failure as a result of big anterior wall MI or large pulmonary embolus.

The exam of the speedy assessment segment must be brief, directed specially closer to the purple flags of on the spot danger. The sensitivity and specificity of those findings are usually now no longer defined. However, the finding of unexpected or "flash" pulmonary edema, a brand

new mitral regurgitant murmur, hypoxia, bradycardia, hypotension, or a brand new S3 sound is ominous.

AMI

Acute myocardial infarction (AMI) is necrosis of a part of the myocardium because of overall or partial occlusion of a coronary artery [6]. An occlusion is as a result of atherosclerosis, a thrombus, or a coronary spasm; it is able to shape hastily or arise over an extended duration of time. Anyone experiencing an AMI is at threat for going into entire cardiac arrest, wherein the heart fails to beat. In the first couple of hours after the onset of signs of an AMI, the improvement of cardiac dysrhythmia provides the finest threat for death. Dysrhythmia might also additionally gift as bradycardia (gradual coronary heart charge), ventricular tachycardia (speedy contraction charge with insufficient ventricular filling), ventricular fibrillation (VF) (speedy, disorganized, abnormal contractions of the ventricle), or asystole (entire absence of coronary heart contractions). Since more than half of the deaths from an AMI arise out of doors of the clinic maximum withinside the first few hours after the onset of signs, provision of basic life support (BLS) in the course of the time spent anticipating the EMTs (emergency medical technicians) to arrive is essential and will keep a existence. This manner that the complete dental office team of workers want to be thoroughly organized to deal with the emergency, such as certification in BLS and use of an automated external defibrillator (AED).

Evaluation

Three primary reassessments of data exist in the course of the evaluation of discipline dysrhythmias: affected person records, bodily exam, and the ECG (electrocardiogram) [1]. Rarely will anybody of those suffice in guiding remedy. Rather, all three taken into consideration collectively manual care. Four steps may be used to manage sufferers. Treatment choices frequently may be made earlier than finishing all steps, permitting an economic system of effort.

Two businesses of sufferers gift with dysrhythmias: asymptomatic sufferers with incidental rhythm adjustments and sufferers with symptomatic rhythm adjustments. Incidental dysrhythmias might also additionally relate to the signs, however are the end result of a noncardiac problem and do now no longer get worse the on the spot final results. Usually, those sufferers have everyday or close to everyday crucial signs. Patients with incidental dysrhythmias, or who're asymptomatic, rarely require discipline rhythm-directed remedy. Those with incidental dysrhythmias commonly require remedy of any underlying acute circumstance (e.g., analgesia for ache or IV fluids for hypovolemia).

Because asymptomatic or incidental dysrhythmias generally require no direct remedy, the prehospital

attention shifts to the ones dysrhythmias related to signs. These sufferers are classified primarily based totally at the severity of signs as both strong or volatile. Although many sufferers have signs as a consequence of the alternate from a "everyday" rhythm, maximum tolerate those properly and are strong. However, volatile sufferers are possibly to go through damage or deteriorate. EMS (emergency medical services) clinicians ought to perceive those volatile sufferers and intrude right away.

After assessing balance, EMS clinicians must categorize the ECG the usage of a easy scheme. Using a conventional technique of isolating dysrhythmias into dozens of classes is tempting however unneeded. In the sphere assessment, examine balance and 3 ECG capabilities: QRS complicated charge (Quantron Resonance System), regularity, and duration.

Up to this factor, little unique records and just a few primary bodily exam and ECG studying capabilities have been required. This is intentional, in order now no longer to litter the sphere assessment for people who want it the maximum (i.e., the volatile affected person) or do now no longer want it at all (i.e., the asymptomatic affected person). The ultimate sufferers are people with signs, albeit none virtually figuring out instability. Here, some questions and moves can assist to direct the perfect prehospital care.

Rate

As a easy rule, all volatile sufferers with nonsinus rapid rhythms (no discernible P waves and QRS charge >120/min) deserve on the spot synchronized countershock with 100 J, growing quick if unsuccessful. Lower strength ranges might also additionally convert unique rhythms, inclusive of supraventricular tachycardia (SVT) or atrial flutter; however little gain is won via way of means of trying to make satisfactory differences in volatile sufferers. Although adjustments in heart rate that fall into the everyday variety can motive signs, those are generally of little significance in the course of discipline control.

In widespread, decrease strength biphasic waveform shocks are similarly or extra powerful than monophasic shocks. However, no final results gain to biphasic waveforms exists. If viable, use the defibrillator manufacturer's endorsed strength ranges for cardioversion and defibrillation, spotting that 100 J is a superb first dose if volatile.

Patients with gradual dysrhythmias handiest require class in their balance. All different details (e.g., P wave characteristics, Type I or II second-degree block, junctional versus ventricular escape) upload little cost in prehospital control. Slow strong dysrhythmias want no intervention except persisted tracking for deterioration. Slow volatile dysrhythmias require outside pacing (preferred) or

atropine (0.5-1 mg IV in adults, repeated as much as 2-3 mg overall). Transcutaneous pacing is quality began out as early as viable to maximise the capping potential for mechanical or medical seize and healing of perfusion. Also, do now no longer put off pacing in volatile sufferers to manage atropine. Conversely, issues of medical deterioration after atropine are unwarranted whilst the right dose is given to people with symptomatic bradycardia, alaven though there can be no reaction. In adults, a vasopressor infusion and an IV fluid bolus must be administered if transcutaneous pacing (or atropine) has normalized the heart charge but hypotension persists.

Defibrillation

Defibrillation is used to treat existence-threatening dysrhythmias inclusive of ventricular traumatic inflammation and nonperfusing ventricular tachycardia [7]. Defibrillation is the transport of sufficient electric strength to the heart to depolarize the myocardial muscle groups and at the equal time reasons minimum electric harm to the coronary heart. This lets in a pacemaker mobileular withinside the coronary heart to renew its rhythmic firing, and restores a normal electric pattern. A surprise will now no longer terminate the dysrhythmia if the strength or present day is just too low. Functional and structural harm to the coronary heart can arise if the strength or present day are too high.

When first developed, defibrillators have been extraordinarily big devices that operated on standard electric present day. These older devices used alternating current (AC) and have been confined to hospitals. In the 1970s, transportable defibrillators that would be used withinside the prehospital putting have been developed. These devices applied direct present day (DC) however have been extraordinarily heavy and bulky, frequently weighing forty kilos or extra. Battery era changed into confined and the unit required recharging right away after use. Now, defibrillators are to be had which can be about the dimensions of a notebook. Many are absolutely automatic, which lets in use via way of means of nonmedical personnel.

Technology has additionally allowed the improvement of a defibrillator unit that may be completely implanted in sufferers deemed at threat for existence-threatening dysrhythmias. These devices, known as implanted automatic cardioverter-defibrillators (IACDs), have emerge as the remedy of desire for unexpected cardiac death. They have reduced mortality from 30 to forty five percentage in step with yr to much less than 2 percentage in step with year. The IACD includes a pulse generator, a lead machine with each sensing and stunning electrodes, included circuitry to investigate the cardiac rhythm and

cause defibrillation, and a energy supply. The existence span of those devices is about 8 years relying upon the frequency of discharge.

Today, there are 3 widespread sorts of outside defibrillators: automatic outside defibrillators (AEDs), semi-automated external defibrillators (SAEDs), and guide defibrillators. Automated devices sincerely require application of the electrodes and turning at the device. Semiautomated devices require that the operator press a button to deliver the electric surprise as directed via way of means of the device. These extraordinarily automatic devices are designed to be used via way of means of first responders and nonmedical personnel. Most airlines now bring automatic outside defibrillators on flights longer than 3 hours. Soon, all big business passenger plane will bring those devices. The guide devices are designed to be used via way of means of skilled medical personnel. They generally have numerous different capabilities such as non-stop cardiac tracking, synchronized cardioversion, hard-copy recording, and outside cardiac pacing. Newer devices permit recording and tracking of a 12-lead ECG. They additionally comprise a diagnostic module that offers a automatic interpretation of the ECG tracing.

The capacity to defibrillate a fibrillating coronary heart relies upon commonly on the electric current delivered to the myocardium. All modern defibrillators use direct current (DC) and save the strength in a capacitor that discharges whilst brought on via way of means of the operator. Factors that hinder the flow of strength to the myocardium consist of resistance to current flow via way of means of the chest wall (transthoracic impedance) and inner lack of strength withinside the defibrillator.

Management

Cardiac dysrhythmia, principally ventricular tachycardia or fibrillation (VT/VF), is a not unusual place precipitating motive of cardiac arrest [8]. Reversible situations such as electrolyte disturbance and ischemia must be taken into consideration. However, the position of antidysrhythmic remedy following ROSC from VT/VF arrest stays unclear, and prophylactic management isn't supported or endorsed. A brief route of remedy can be warranted for instances of recurrent malignant dysrhythmia or in sufferers who attain ROSC in reaction to remedy if no opportunity reversible circumstance is identified.

Sinus bradycardia in the course of healing cooling is not unusual place and usually properly tolerated. Negative chronotropes inclusive of β -blockers and amiodarone must be prevented unless strongly indicated. Severe bradycardia ensuing in hypoperfusion in the course of healing cooling warrants slight elevation of the goal temperature.

Surgery

Cardiac surgical treatment is one of the maximum usually carried out principal operative techniques withinside the United States [9]. The symptoms for cardiac surgical treatment consist of myocardial ischemia and infarction, heart failure, valvular dysfunction, aortic pathology, and surgical treatment for dysrhythmias. The control of sufferers following cardiac surgical treatment calls for a multifaceted technique and the involvement of a crew of specialists. While the intensivist is frequently the factor man or woman for the control of the sufferers following open coronary heart surgical treatment, it's miles important that the control contain the surgeon, cardiologist, and anesthesiologist, and a huge style of different health care providers.

Successful postoperative control following cardiac surgical treatment calls for a clean information of the affected person's preoperative situations and the intraoperative activities and control. The aim is to repair the affected person's everyday physiologic circumstance and homeostasis. As clinical control and interventional cardiology techniques evolve and improve, the sufferers being referred for cardiac surgical treatment are sicker and extra debilitated than they have been withinside the past. This fashion is possibly to preserve withinside the years to come. Despite those improved demanding situations dealing with cardiac surgeons, affected person consequences stay excellent in big component because of the postoperative control and ICU (intensive care unit) care. A systemsoriented technique is frequently necessary to address the multitude of troubles dealing with those sufferers, and the cardiac machine is usually the number one determinant of recovery.

Conclusion

A cardiac arrhythmia, or abnormal heart rhythm, can occur when the electrical impulses that coordinate the heart's rhythm do not travel normally. This causes the heart to beat too fast, too slowly or irregularly. When the heartbeat is too fast, too slow, or irregular, the heart may not be able to pump enough blood around the body. Arrhythmias can be associated with serious symptoms that can affect the ability to function. Lack of blood flow can damage the brain, heart and other organs. If irregular heartbeats are frequent or chronic, they can be very serious. Dangerous arrhythmias are most often associated with a weak or damaged heart.

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