



Recognizing and management of arrhythmia: Overview of nurses' role

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Abstract

Arrhythmia leads to decreased quality of life, a high risk of developing thromboembolism, and an increased mortality rate. Cardiac arrhythmia may be non-symptomatic or cause several symptoms, including heart attacks, dizziness, chest pain, and loss of consciousness. Management of patients with cardiac arrhythmias is increasingly complex because of continuous technological advances and multifaceted clinical conditions associated with the ageing of the population, co-morbidities, and the need for polypharmacy. Nurses can significantly contribute to detecting and managing these increasingly common diseases. Nurses should consider any patient with an irregular pulse with arrhythmias and direct suspected cases to electrocardiograms. Management of arrhythmias aims to reduce symptoms and prevent complications with antithrombosis, cardiovascular stimulation, and anti-arrhythmia therapy.

Keywords: cardiac arrhythmia, ECG diagnosis, arrhythmia management, nursing care standards

Introduction

Normally, a special heart cell produces electrical signals passing through the heart. Electricity causes contraction of the heart muscles, resulting in a heart rate. An arrhythmia means the heart is not beating in the proper rhythm. This may lead to minor symptoms such as heart attacks and death. Because different rhythmic disorders require additional treatment, it is important to diagnose the exact types of rhythmic disorders. Cardiac arrhythmia is defined as an irregular heart rate, rhythm, or both. Arrhythmias are often grouped according to the location of the abnormality in the conduction system – whether in the sinoatrial node, or the atrioventricular junction (the area around the AV node and the bundle of His), or the ventricles ^[1]. Arrhythmia is an abnormal pattern or pattern of the heartbeat. When having an arrhythmia, the heart may beat too quickly or too slowly, or a patient may experience an irregular rhythm in which the heart feels as if it is "skipping a beat". Some types of arrhythmias may not be serious. Other types may be of great concern because they can cause fainting, heart failure, or sudden death ^[2].

Approximately one-third of people with arrhythmias exhibit asymptomatic, preventing timely diagnosis and treatment. According to the world health organization, dysrhythmias are the most common complications that lead to death worldwide. In individuals who experience symptoms, these may include sensations of a racing or pounding heart, chest pain, shortness of breath, dizziness, lightheadedness, anxiety, losing consciousness, and reduced capacity to exercise, which can impair the quality of life in some cases. Symptoms can be dangerous and life-threatening and may even lead to sudden cardiac death ^[1].

Increasingly important to identify and treat people promptly, and the nursing staff is a key component in facilitating this process ^[3]. Arrhythmias can affect all age groups. Drinking alcohol in excess or being overweight increases the likelihood of developing arrhythmia. May also be at risk of developing an arrhythmia if r heart tissue is damaged because of an illness, such as having had a heart attack or heart failure. Common arrhythmias are viral illnesses, alcohol, tobacco, changes in posture, exercise, drinks containing caffeine, certain over-the-counter and prescribed medicines, and illegal recreational drugs [National Health Services (NHS, 2022)] ^[4]. Some heart rhythms occur in people with severe heart disease and cause sudden heart failure ^[4]. These deaths could have been avoided if the arrhythmias had been diagnosed earlier. The United Kingdom has over two million people experiencing heart rhythm or heart rate problems. Most people with an abnormal heart rhythm can lead an everyday life if properly diagnosed ^[5].

The term "arrhythmia" is very general, referring to all rhythms other than regular sinus rhythm. The term "dysrhythmia" meaning "imperfection in a regularly recurring motion" has been proposed. Dysrhythmia falls into two categories: abnormality of impulse formation and abnormalities of impulse conduction. Abnormal impulse formation results from automaticity alteration or triggered activity, while abnormal impulse conduction results from re-entry or ischemia. Abnormal automaticity is the spontaneous depolarization in abnormal myocardial tissues, and triggered activity results from after depolarization. After depolarization, fluctuations in the membrane potential occur in late repolarization or just after repolarization. Reentry means repeatedly depolarising the same tissue area, and cardiac ischemia alters the action potential in several ways ^[6].

The nurses need to recognize normal and abnormal cardiac rhythms (Dysrhythmias). It is essential to understand nursing intervention, early recognition of the problem, and understanding what arrhythmias are and how to manage patients with cardiac arrhythmias. This article presents and discusses the nursing role in managing the

arrhythmias most commonly encountered in the coronary care unit and those seen rarely and describes and illustrates their defining features. Some flaws may lead to the wrong diagnosis ^[7].

Assessment of symptoms for rhythm control

The 12 leads electrocardiogram (ECG) is the diagnostic reference standard for evaluating cardiac rhythm and cardiac ischemia. The 12 leads ECG utilizes viewpoints for recording cardiac electrical activity: base-apex, left-right, frontal plane, and transverse (horizontal). The 12 leads ECG is more sensitive than a patient self-reporting system (e.g., chest pain, chest discomfort) for detecting transient myocardial ischemia or dysrhythmia because 70-90% of the episodes are clinically silent. Patients with arrhythmia are first assessed using medical history (current and past), symptoms, and physical examinations. Their past medical history helps them choose treatment options, and their recent history helps identify possible causes, such as coexisting heart disease and triggers (e.g., alcohol, infection, or a new cardiac event) ^[8].

While many patients with arrhythmia may be managed initially in primary care, chest pain, pre-syncope, syncope, acute breathlessness, bradycardia, tachycardia, and hypotension may indicate that more urgent assessment in the hospital or ambulatory care is necessary. 'Rhythm control' means that attempts to maintain or restore sinus rhythm will be made. Three approaches are available; antiarrhythmic drugs, cardioversion (electrical or chemical) and/or ablation. Successful rhythm control endeavors are likely higher when treating patients in the early stages of developing arrhythmia. The NICE guidelines indicate when rate and rhythm control endeavors should be considered. After comprehensive discussions between experts, the final decision on the best management strategy must be made (and another clinician when relevant) and the patient ^[9].

Taking the patient's history

The effectiveness of history is based on the ability of health professionals to communicate and listen well and to have good clinical knowledge. Patients suffering from arrhythmias are often very anxious and require a detailed explanation of their situation and treatment options to alleviate their concerns and improve compliance. To facilitate this, it is necessary to collect the necessary information. A comprehensive history will include biographical details, current complaints, past medical histories, family histories, personal and social histories, and system review. The components of history taking will structure the patient's story and format the written record ^[10]. Complete histories should focus on symptoms such as heart attacks, chest pain, breathing problems, increased vascularization of the lower extremities, exertion, dizziness, etc. Furthermore, history is essential to identify risk factors such as hypertension, heart rate history, structure or heart failure, obstruction of sleep apnea, obesity hypoventilation syndrome, smoking, alcohol intake, illicit drug use, history of rheumatic fever/heart disease, history of pericarditis, hyperlipidemia, among others. A physical exam should include the patient's overall appearance (obese), examination of the patient neck for signs of JVD, and carotid bruits circumference. Cardiovascular examination should carefully auscultate all four heart positions and palpate apical impulses. A pulmonary examination must include a pulmonary assessment, a percussion, and, if necessary, special tests to assess the lung state. Extremes should be evaluated for oedema, peripheral pulses at the upper and lower extremities, and indicative signs ^[11].

Evaluation

Aside from a detailed history and examination, the electrocardiogram (ECG) is critical in diagnosing arrhythmias. A precise ECG interpretation requires good recording quality and the proper position of the electrode. If ECG is not correctly recorded, it is more likely to be misinterpreted and may adversely affect patient care ^[12]. Therefore, it is recommended to follow the guidelines for recording ECG:

Sinus rhythm

The normal rhythm of the heart in sinus rhythm; This is recognized on the ECG by regular P-waves, which are positive in leads I and II, at a rate between 60 and 100 beats per minute (bpm), with every P-wave followed by a QRS complex and every QRS complex preceded by a P-wave. Sinus rhythm with a beat-to-beat variation in the P-P interval (the time between successive P waves), producing an irregular ventricular rate. The QRS complex is the name given to the three deflections between the Q, R, and S waves shown in an ECG.

Sinus bradycardia

A slow sinus rhythm and heart rate less than 60 bpm; sinus bradycardia at a rate of 40 bpm. Physical fitness and pharmaceutical therapy may reduce the rate of beta-blockers, so there is no reason to worry; however, if sinus bradycardia appears inappropriate or profound, it may be caused by sinus disease or beta-blocker toxicity, and this warrants further investigation. It is normal during sleep.

Sinus tachycardia

A sinus rhythm with more than 100 bpm of heart rate; sinus tachycardia at 120 bpm. It is a normal response to exercise, fear, and anxiety, but an explanation should be sought if found in a resting individual. Sinus tachycardia usually does not need to be treated, but its cause can. Possible causes of sinus tachycardia include fever, lung edema, heart failure, high thyroid rate, and anemia.

Sinus arrhythmia

Sinus rhythm is a benign variant of the sinus rhythm common to adolescents and young adults. Usually, this rate accelerates during the inspiration and slows down during expiry; therefore, this rate changes continuously and cyclically.

Remature beats

Also known as ectopic, premature beats are common and may be asymptomatic or responsible for irregular, missed, or heavy sensations. They may originate in the atria or ventricles.

Atrial premature beats (APBs) are recognized by a premature P-wave of a different shape from the normal P-wave of sinus node origin. The first wave of the P usually follows a normal or almost normal QRS complex, and then a short break before the next sinus beat appears. Sinus rhythm with an APB. In this case, the premature P-wave is superimposed on the T-wave of the previous beat, and an arrow indicates it.

Ventricular premature beats (VPBs): as their name suggests, ventricular premature beats originate in the ventricles. A typical example of a VPB. Ventricular premature beat (indicated by arrow). As a result, they are not preceded by a premature P-wave, and the QRS is broad and bizarre. A pause normally follows them. The premature QRS is shown with an arrow. VPBs are common, and while they often occur in healthy individuals, they are more common in people with heart disease.

Atrial fibrillation

Atrial fibrillation (AF) is the most common sustained arrhythmia. Atrial fibrillation may be asymptomatic, but it is also responsible for various symptoms and conferring a five-fold increase in the risk of stroke. It is characterized by disorganized atrial electrical activity and contraction Figure 1. The incidence and prevalence of atrial fibrillation are increasing. Lifetime risk over the age of 40 years is ~25%. Complications of atrial fibrillation include hemodynamic instability, cardiomyopathy, cardiac failure, and embolic events such as stroke. It is important to recognize atrial fibrillation in order to start appropriate therapy. It is important not to diagnose it in its absence because anticoagulant therapy to prevent stroke is potentially dangerous. Atrial fibrillation when was present and diagnosed when it was absent. A diagnosis of atrial fibrillation was more likely to be wrong than right.

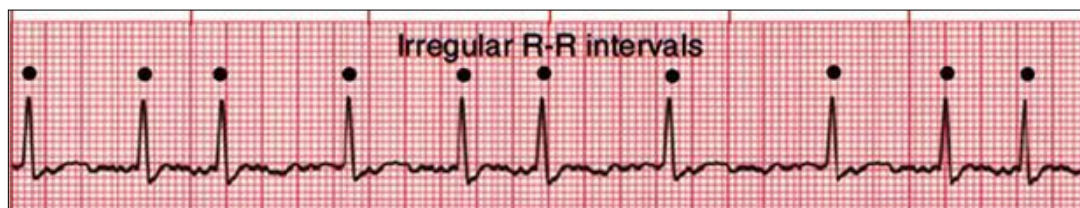


Fig 1: Atrial fibrillation

An example of atrial trigeminy. In this case, every third beat (circled) is an APB; however, the rhythm is irregular. All sinuses can clearly see P waves (indicated by arrows) and show that this is not atrial fibrillation.

Atrial flutter

Atrial flutter is a form of supraventricular tachycardia caused by a reentry circuit within the right atrium. The length of the reentry circuit corresponds to the size of the right atrium, resulting in a fairly predictable atrial rate of around 300 bpm (range 200-400), but not all the atrial impulses conduct to the ventricles, with the result that the ventricular rate is less than the atrial rate, and may be regular or irregular. A characteristic 'sawtooth' baseline recognizes atrial flutter, usually best seen in leads II, III, aVF, and V1 (Figure 2). In this example, one in every four atrial impulses conducts the ventricles, and the ventricular rate is regular at 67 bpm. Based on the normal heart rate, it is important not to assume that this must be sinus rhythm because atrial flutter has the same implications as AF for anticoagulation.



Fig 2: Atrial flutter

Supraventricular tachycardia

Supraventricular tachycardia (SVT) refers to any tachydysrhythmia arising from above the level of the Bundle of His and encompasses regular atrial, irregular atrial, and regular atrioventricular tachycardias.

It is usually to be a fast, regular rhythm, possibly as fast as 250 bpm, that originates in, or depends on the involvement of, the atria or atrioventricular node. It occurs suddenly and usually does not cause fatal symptoms but can cause discomfort, anxiety, difficulty breathing, chest pain, and dyspnea. The ECG during SVT shows rapid, regular QRS complexes, usually with a normal shape and no clear P-waves; an example of SVT with a rate of 170 bpm is shown in Figure 3 (National Institute for Health and Care Excellence (NICE), 2015).

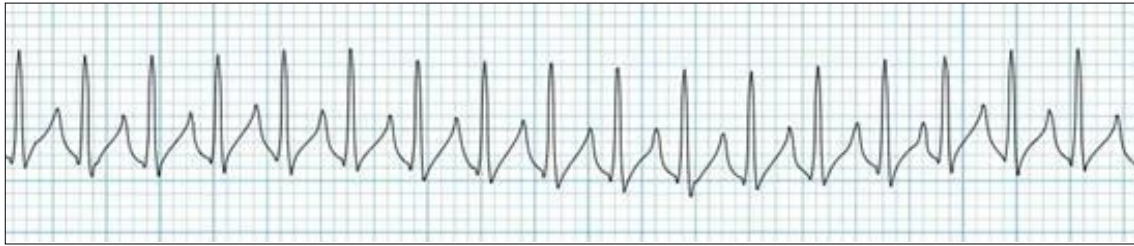


Fig 3: Supraventricular tachycardia

Ventricular tachycardia

Ventricular Tachycardia (VT) is a broad complex tachycardia originating from the ventricles. There are several different forms of VT -the most common is monomorphic VT, which originates from a single focus within the ventricles. Ventricular tachycardia is a regular rhythm, but it is a potentially life-threatening arrhythmia. Although it is unlikely to be encountered frequently in primary care, it needs to be identified and dealt with quickly if seen. It occurs most commonly in people with significant structural heart disease. Its name implies a fast rhythm, usually between 120 and 250 bpm, that arises in the ventricles and is recognized on the ECG by the broad and bizarre QRS complexes that are not preceded by P-waves. Shows in figure 4 an example of VT at a rate of 190 bpm.

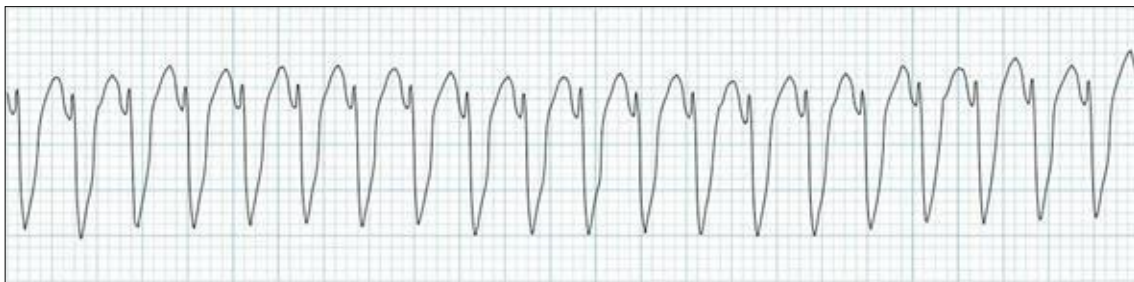


Fig 4: Ventricular tachycardia at 190 bpm

Heart block

Heart block – or atrioventricular (AV) block – falls into three categories: first, second and third-degree block. First-degree block, defined by a prolonged PR interval, rarely causes any problems or requires treatment, although it may indicate beta-blocker toxicity. Figure 5. Show Second, and third-degree blocks are more important as they may indicate the implantation of a pacemaker.

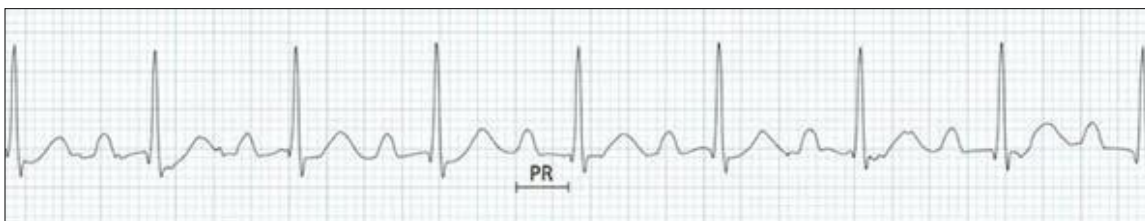


Fig 5: First degree heart block

Second-degree block

In the second-degree block, not all atrial impulses are sent to the ventricle, i.e., some P waves are not followed by the QRS complex. The second-degree blocks can be subdivided into Wenckebach (or Mobitz I), Mobitz II, and 2:1 blocks. In the Wenckebach AV block, the PR interval increases in successive beats until a P-wave is not followed by a QRS, resulting in a pause. This sequence then typically repeats; an example of the Wenckebach block is shown in Figure 6; there is an underlying sinus rhythm, but it can be seen from the blue bars that the PR interval increases from beat to beat until a P-wave (indicated by an arrow) is not conducted. After the subsequent interruption, the PR interval returned to normal and increased again in successive pulses. Although Wenckebach block is often a benign finding and may be due to high vagal tone, it is finding in primary care, especially if associated with symptoms of possible cardiac origin, may be an indication for pacemaker implantation and should therefore prompt a cardiological referral.

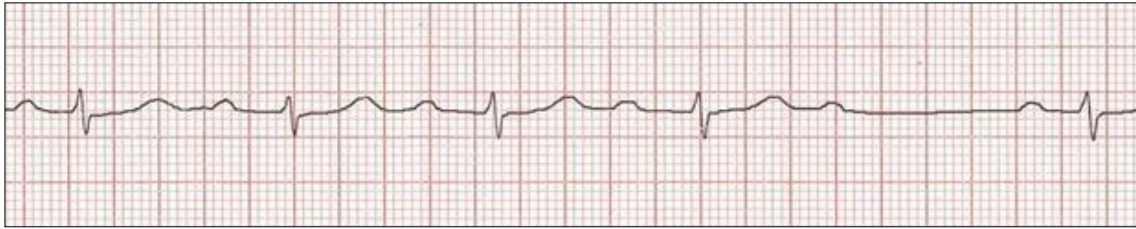


Fig 6: AV block: 2nd degree, Mobitz type I

In the Mobitz II block, there is the intermittent failure of atrial impulses to conduct to the ventricles, but in contrast to the Wenckebach block, there is no preceding increase in the PR interval, and the PR intervals of all conducted beats are identical. This phenomenon is shown in figure 7, where arrows display the P wave that is not conducted. Mobitz II AV block is usually associated with progressive disease of the heart's conduction system and, when discovered, normally leads to the implantation of a permanent pacemaker.

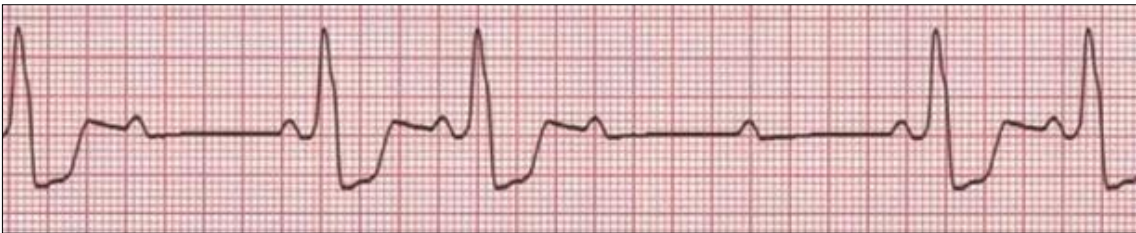


Fig 7: AV block: 2nd degree, Mobitz type II

Third-degree block

There is a complete absence of AV conduction in complete heart block, with none of the supraventricular impulses conducted to the ventricles. The perfusion rhythm is maintained by the escape rhythm of the junction or ventricular. Alternatively, the patient may suffer ventricular standstill leading to syncope (if self-terminating) or sudden cardiac death (if prolonged). It is more commonly known as 'complete' block, no atrial impulses conduct to the ventricles, and for this situation to be compatible with life, the atrioventricular node or ventricles must generate their own impulses. The three hallmarks of complete heart block on the ECG are: Atrial rate is faster than ventricular rate; The pace of the ventricles is slow and consistent, and there is no relationship between the atrial impulse and the ventricular impulse.

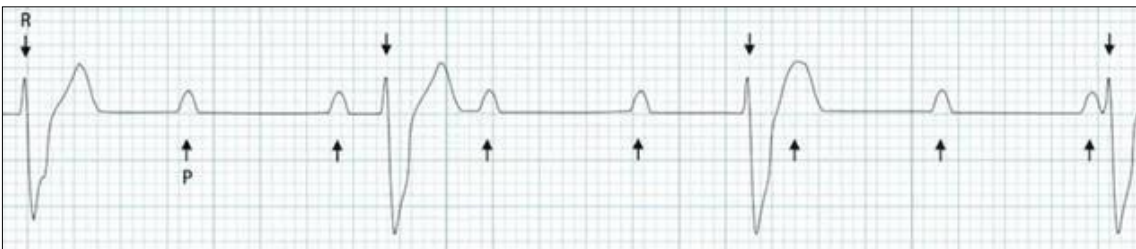


Fig 8: Complete heart block

Medical Management

Cardiac arrhythmias management in a particular patient can extend for many years and includes a variety of treatments and procedural interventions, which are more and more complicated. Furthermore, patients' clinical conditions are increasingly complex because of the influence of ageing, the presence of significant co-morbidities, and polypharmacy. For these reasons, diagnostic or therapeutic procedures can produce important benefits and complications, not limited to the heart. An integrated team approach including different health professionals may provide a personalized and possibly more effective treatment plan for the individual patient^[13]. The presence of dysrhythmia with hemodynamic compromise needs prompt treatment. The treatments for arrhythmia are urgently needed if arrhythmia causes serious symptoms, such as dizziness, chest pain, or fainting and increases the risk for heart failure, stroke, or sudden cardiac arrest. Common dysrhythmia treatments include medicines, medical procedures, and surgery.

The patient's hemodynamic stability and risk classification are based on the acute treatment of arrhythmias. If patients have a rapid ventricular response, it is recommended to use beta-blockers or calcium channel blockers to start rate control. These medications can be used as intravenous (IV) pushes or drips. Usually, the patient receives a Bolus and then injects it if the symptoms are not resolved. Digoxin is considered a rate control drug but is not recommended for first-line drugs due to side effects and resistance. Amiodarone is also considered a rhythm control agent, but it is not the first line of therapy in acute settings. Amiodarone is also considered to control heart rate, but it is recommended to consult a cardiology physician before using it^[14].

Monitoring

The challenge facing nurses, in particular, is the awareness and adaptation of the changing health needs of patients. There is a need to monitor a wide range of patients to improve the detection of arrhythmias in the first place. Subsequently, arrangements must be made to ensure that arrhythmias patients receive appropriate treatment. This can be very common at the initial presentation and diagnosis, including primary care, secondary care, tertiary care, and warfarin clinics. Once the patient's condition is stable and the management plan has been agreed upon, an appropriate review appointment must be scheduled every year. (NICE, 2014). A detailed discussion of some of the points to be considered during the appointment of arrhythmias review. These are based on the authors' clinical experience and NICE guidelines. People at high risk of a stroke but who do not have an anticoagulant may be prioritized, and a review is required to discuss the matter further. Adopting an objective approach to the review of patients with known arrhythmias seems very desirable to supplement the current attempts at stroke prevention ^[9].

Nursing Interventions and Management

Nurses needed to identify and respond to cardiac arrest to detect life-threatening arrhythmias and decrease mortality in acute MI patients. Staff education involved in detecting emergent arrhythmias such as systole and ventricular tachycardia includes bradycardias, heart blocks, and wide and narrow complex tachycardias. Nurses are now charged with post-cardiopulmonary resuscitation support beyond early recognition and response to cardiac arrest, which requires continuous physiological parameters assessment through hemodynamic monitoring to recognize typical complications ^[15]. It is now widely recognized that nurses' skills and experiences from arrhythmias services are extremely valuable. The role of specialist nurses is to make professionally autonomous decisions. The nurses are accountable for receiving patients with undifferentiated and undiagnosed problems and providing education and support to other healthcare professionals. Nurses provide care in hospitals to ensure patients receive good care for their cardiac arrhythmias. Nurses need a deep understanding of nursing care priorities for patients with dysrhythmias. Nurses are responsible for a complex performance, implying a specific knowledge and practice needed to provide specific nursing implementation ^[16].

The main goal of therapy is to ensure adequate heart performance and tissue flow and prevent patients from developing thromboembolism and cardiac arrest. The medical team should be notified immediately if the patient's heart rate is rapid and if the systolic blood pressure is less than 90mmHg (Resuscitation Council UK, 2000). In emergency cardioversion, explaining the procedure and reassuring the patient to resolve the hemodynamic complications. Careful positioning of these patients is essential to avoid the exacerbated condition. If the patient is breathless, administration of oxygen may be useful. To reduce the patient's anxiety, they should explain the cause of the symptoms and suggest what can be done to correct them ^[17]. If the patient has chest discomfort, it should be asked if oxygen therapy is useful, as this indicates myocardial insufficiency. In the acute phase, patients require continuous heart monitoring. Once the sinus rhythm is restored, treatment therapy for patients may need to be taught ^[18]. Management of cardiac arrhythmias is increasingly complex because of continuous technological advances and multifaceted clinical conditions associated with the aging of the population, co-morbidities, and the need for polypharmacy.

1. Document any irregular heartbeat in the monitored patient.
2. If an unmonitored patient changes pulse patterns or speed, notify the doctor.
3. As ordered, obtain an ECG tracing in an unmonitored patient to confirm and identify the type of arrhythmia present.
4. Prepare to start cardiopulmonary resuscitation if indicated when a life-threatening arrhythmia occurs.
5. Drug administration according to instructions, monitoring of side effects, and nursing intervention related to vital signs, hemodynamic monitoring, and laboratory work appropriate to nursing.
6. Provides adequate oxygen, reduces the heart load, and maintains a careful balance between metabolism, neurological, respiratory, and hemodynamic conditions.
7. Evaluate the monitored patient's ECG regularly for arrhythmia.
8. Monitor the prevalence of factors such as liquid and electrolyte imbalances, particularly signs of drug toxicity with digoxin.
9. Teach patients to take their pulses, recognize irregular rhythms, and tell them to report changes to doctors at baseline.
10. Emphasize the importance of keeping laboratory and physician's appointments.

Nurse counseling

Despite these advances, nurses still need to help patients achieve educational, advice, and support needs, often not optimal. Doctors tend to underestimate patients' understanding of the advantages and satisfaction of arrhythmia therapy while overestimating complications knowledge. During this period, nurses can help relieve the psychological burden of arrhythmias. Nurses can also help patients to achieve realistic expectations for treatment. The authors argue that relatively high proportions of patients are satisfied with the treatment, but a worry about illness and lasting symptoms may show that the patient is experiencing the disease 'feel resigned to their situation rather than able to affect it through their actions or via consultations with their physician' ^[19].

Conclusion

All arrhythmias likely to be encountered in the coronary care unit can be identified reliably from the ECG. It helps recognize many arrhythmias if atrial activity can be reliably identified, and this process is facilitated when the recording is of good quality. The accurate recognition of arrhythmias may help guide patient decisions and appropriate management of the patient's condition. Patients with arrhythmias may be ill at an acute stage but usually respond quickly to treatment. During this period, nurses can provide patients with physical support and help alleviate their fears and fears.

Arrhythmias increase the risk of stroke, heart failure, and death, but many health professionals underestimate the risk factors for modifiable cardiovascular diseases. Consequently, nurses should be vigilant about the risk of cardiac arrhythmias when measuring pulse rates. However, the most recent arrhythmia medications can improve effectiveness and safety. As the number of arrhythmias patients increases, nurses can help identify, prevent and manage these common causes of mortality and morbidity.

Recommendations

The improvement in the management of arrhythmia is the key to significantly reducing the burden of stroke. However, arrhythmia management is broader than stroke prevention, including patient education, psychological support, and interventions to minimize or relieve symptoms. It is also crucial to consider long-term monitoring issues, including the review of patients, to determine whether long-term treatment is safe and effective. Clearly defined standards should guide nursing care to ensure a high quality of care. Standards of care are authoritative statements that describe a common or acceptable level of patient care.

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Conflicts of interest

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