How to ensure patient observations lead to effective management of bradycardia

Bradycardia can be an indication of life threatening heart block or impending asystole. It is vital that nurses can detect and respond to this clinical sign.

Bradycardia is defined in an adult as a heart rate of <60 beats per minute (Resuscitation Council UK, 2006). Although it can be a normal physiological finding – for example, in fit young people (Gwinnutt, 2006) – and therefore require no treatment, in the healthcare setting it should always be considered abnormal until proved otherwise.

In acute illness bradycardia may be a feature of potentially life threatening atrioventricular (AV) (heart) block or a precursor of asystole (when the heart stops beating) (Resuscitation Council UK, 2006). Bradycardia can be a normal physiological sign in fit young adults. However, in acute illness it may indicate life threatening heart block or precede asystole. This article outlines the assessment and management of patients with this condition.

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**CLINICAL SIGNS OF CRITICAL ILLNESS**
Tachypnoea, tachycardia, hypotension and altered level of consciousness are the adverse signs usually associated with critical illness, reflecting compromise of the body’s respiratory, cardiovascular and neurological functions (Nolan et al, 2005). Although less commonly associated with critical illness, bradycardia may also be a sign of deterioration and cannot be ignored.

It is, therefore, important to be able to detect and respond appropriately to this clinical sign.

**COMPETENCIES**
- When measuring heart rate, nursing staff (including healthcare assistants) should be able to identify abnormal values, record results and assign trigger scores.
- Registered nurses should be able to interpret heart rate measurements and respond appropriately following local early warning score (EWS) escalation protocols if needed.
- They should be able to alter the frequency of EWS observations and intervene with basic treatment measures.
- If electrocardiogram monitoring is indicated, nurses should be competent at performing it (including knowledge of how the ECG machine works) (Department of Health, 2009).

**FIG 1. SINUS RHYTHM**

**FIG 2. SINUS BRADYCARDIA**

**FIG 3. THIRD DEGREE AV BLOCK (COMPLETE AV BLOCK)**
accurately measure and assess patients’ pulse/heart rate. This is a main component of the Resuscitation Council UK’s (2006) systematic airway, breathing, circulation, disability, exposure (ABCDE) approach to assessing patients who are critically ill.

Sinus bradycardia has the same electrocardiogram characteristics as sinus rhythm (normal ECG rhythm), except that the rate is less than 60 beats/min (Jevon, 2009). Figs 1, 2 and 3 show sinus rhythm, the rate is less than 60 beats/min (Jevon, 2009); normal ECG rhythm, except that electrocardiogram characteristics as sinus rhythm (Nolan et al, 2005);

CAUSES OF BRADYCARDIA
The vagus (parasympathetic) nerve has an important role in controlling heart rate. Continuous vagal activity (vagal tone) acts as a brake on the heart: when vagal activity increases, the heart rate slows, and when vagal activity diminishes, the heart rate increases (Jevon, 2009).

During sleep, vagal activity increases, sometimes resulting in a normal bradycardia. Stimulation of the vagus nerve, for example, during tracheal suction, can also result in bradycardia.

The sympathetic nerve is involved in the “fight or flight” response and has the effect of increasing heart rate. Beta-adrenoceptor antagonists (beta-blockers) such as atenolol and bisoprolol, shield the heart from excessive sympathetic activity, which can result in bradycardia (often a desired effect). When patients present with a slow heart rate, it is prudent to check their medication history to see whether or not these medicines have been prescribed.

The heart rate is ultimately controlled by the cardiac centre in the medulla oblongata. Damage to this as a result of hypoxia or cerebral insult, such as a stroke, can lead to bradycardia.

There are many bradycardia related cardiac arrhythmias including sinus bradycardia and AV block. AV block is when the conduction of the cardiac impulse through the AV junction is delayed or blocked. There are varying degrees of AV block: first, second and third (complete). Other causes of bradycardia include:

- Myocardial infarction;
- Hypothermia;
- Hypoxia;
- Hypothyroidism;
- Hypovolaemia;
- Raised intracranial pressure (Jevon, 2009; Gwinnutt, 2006; Wyatt et al, 2006).

MANAGING PATIENTS WITH BRADYCARDIA

- Assess patients following the ABCDE approach to ascertain whether they are critically ill. Ensure appropriate senior help is called if necessary, following early warning score (EWS) escalation protocols;
- Ensure patients have a clear airway and are breathing adequately;
- If patients are critically ill, start prescribed emergency oxygen (see part 2 of this series, Jevon, 2010);
- Monitor vital signs and complete the EWS chart following local protocols. It is important to adjust the frequency of EWS observations as appropriate;
- Try to identify the cause of the bradycardia. In particular, check medication history. If patients have been prescribed a beta-adrenoceptor antagonist seek medical advice. It may be necessary to withhold the drug until they are medically reviewed;
- If patients are hypotensive or feel lightheaded, it is important to lie them flat;
- Start ECG monitoring if appropriate and, if possible, record a single lead ECG strip from the monitor; this will help the clinician to accurately interpret the ECG rhythm;
- Prepare for intravenous cannulation to administer drugs such as atropine, if indicated;
- Record a 12 lead ECG; this will help to establish the correct interpretation of the ECG rhythm (Nolan et al, 2005);
- If necessary, assist medical staff with interventions such as administering atropine, pacing to raise the heart rate and monitoring the effect on pulse rate (Jevon, 2009).
practice review

TREATING BRADYCARDIA
A comprehensive account of the treatment can be found elsewhere (Jevon, 2009). The main points are outlined in Box 1.

Resuscitation Council UK adult bradycardia algorithm
The Resuscitation Council UK’s (2006) adult bradycardia algorithm is designed to help non-specialist healthcare professionals provide effective and safe treatment in emergency situations (see Fig 4).

Atropine
If adverse signs associated with bradycardia are identified following assessment, atropine is the first drug treatment (Wyatt et al, 2006). Atropine blocks the action of the vagus nerve with the aim of increasing the heart rate. The initial dose is 500mcg IV; it can be repeated every 3-5 minutes up to a maximum of 3mg (Jevon, 2009).

Transvenous pacing
If patients do not respond to atropine and remain unstable and/or there is a risk of asystole, transvenous pacing will usually be required (Nolan et al, 2005). Transvenous pacing is the insertion of a pacing electrode through a vein into the right ventricle to pace the heart. While waiting for the appropriate expertise and facilities to be arranged, interim measures to help prevent deterioration and improve the patient’s condition include:

- Transcutaneous pacing (pacing electrodes applied to the patient’s skin to pace the heart);
- Percussion pacing (gentle blows over the pericardium);

CONCLUSION
Bradycardia could indicate critical illness and/or a risk of asystole. Nurses should always assess patients following the ABCDE approach. They should also complete EWS charts following local protocols, ensuring escalation protocols are followed if required. If necessary they should start ECG monitoring and record a 12 lead ECG.

REFERENCES

- Jevon P (2010) How to ensure patient observations lead to prompt identification of tachypnoea. Nursing Times; 106: 2, early online publication.