Monitoring pulse

AUTHOR Jo Trim, M. Phil, BSc, RN, is nurse adviser, University Hospital Birmingham Foundation Trust.

The pulse, or heart rate, is taken to assist with the assessment of a patient’s cardiovascular function (NT Skills, 8 April 2003, p29).

Anatomy, physiology and location

The pulse is a wave-like sensation indicative of arteries expanding during the systolic phase and recoiling during the diastolic phase of each cardiac cycle (Pritchard and Mallett, 2001). Pulse is strongest in arteries close to the heart and becomes progressively weaker as it passes through the arterial system, disappearing in the capillaries (Tortora and Anagnostakos, 1990). Each pulse wave corresponds to a heart beat.

Pulse can be felt by placing fingers over any artery lying close to the skin surface. The site most commonly used is the wrist (radial or ulnar arteries) because it is non-invasive and easily accessible but other artery sites can be used (Fig 1).

Assessment

When taking a patient’s pulse the rhythm and amplitude should be assessed as well as the rate.

Rate

For adults and adolescents, when resting, the pulse averages 60 to 100 beats per minute (bpm). A pulse over 100bpm is known as tachycardia. This may be caused by hypovolaemia, raised body temperature, stress, medication, heart disease, infection or exercise (Pritchard and Mallett, 2001). A pulse below 60bpm is known as bradycardia, caused by activation of the parasympathetic nervous system, heart failure, medication or patients who are very fit. Normal pulse rates, however, vary with age (Pritchard and Mallett, 2001):

- Newborn: 120–160bpm
- 1–12 months: 80–140bpm
- 12 months–2 years: 80–130bpm
- 2–6 years: 75–120bpm
- 6–12 years: 75–110bpm

Rhythm

Rhythm is the sequence of beats, which in normal good health is regular (Pritchard and Mallett, 2001). Disturbance of the heart’s normal conduction system can cause irregular heart rhythms, for
example atrial fibrillation, which may in turn adversely affect the patient’s blood pressure and her or his ability to oxygenate vital organs, for example the kidneys.

**Amplitude**
Amplitude refers to the strength of the pulse and reflects the elasticity of the arterial wall (Pritchard and Mallett, 2001). If a pulse feels weak and thready, it may indicate hypovolaemia. A strong and bounding pulse could be an indication of infection (Trim, 2004).

**The procedure**
It is common practice to take a patient’s pulse using an electrical device. However, taking a manual pulse is essential to identify rhythm or amplitude irregularities as these factors cannot be assessed using an electrical device.
- Adhere to local infection control policies and ensure appropriate handwashing.
- Explain the procedure to the patient to obtain informed consent.
- Place one or two fingers over the pulse site, commonly radial, ulnar, or in an emergency situation carotid arteries, applying gentle pressure (Fig 2, Fig 3).
- Identify the pulse, feeling for the characteristic wave-like sensation.
- Looking at a clock or watch with a second hand, (Fig 4) count the number of beats over either 30 or 60 seconds.
- During or after counting the rate, assess for pulse rhythm and amplitude.
- Document the reading and rhythm or amplitude irregularities on the observation chart immediately (Fig 5).
- Compare this figure with previous pulse readings, taking into consideration the patient’s clinical condition.

If the patient has a slow or irregular pulse it is important to assess the pulse over 60 seconds rather than 30 seconds to ensure an accurate reading. If an electrical device is used to take the patient’s pulse it is important to also take the reading manually to assess for rhythm or amplitude irregularities.

**Professional responsibilities**
Health care practitioners should only undertake this procedure if they have been assessed as competent by their trust. If an electrical device is used, the practitioner should ensure she or he has received the appropriate training to meet Clinical Negligence Scheme for Trusts requirements. It is the responsibility of the individual practitioner to maintain her or his knowledge and skill in this procedure.