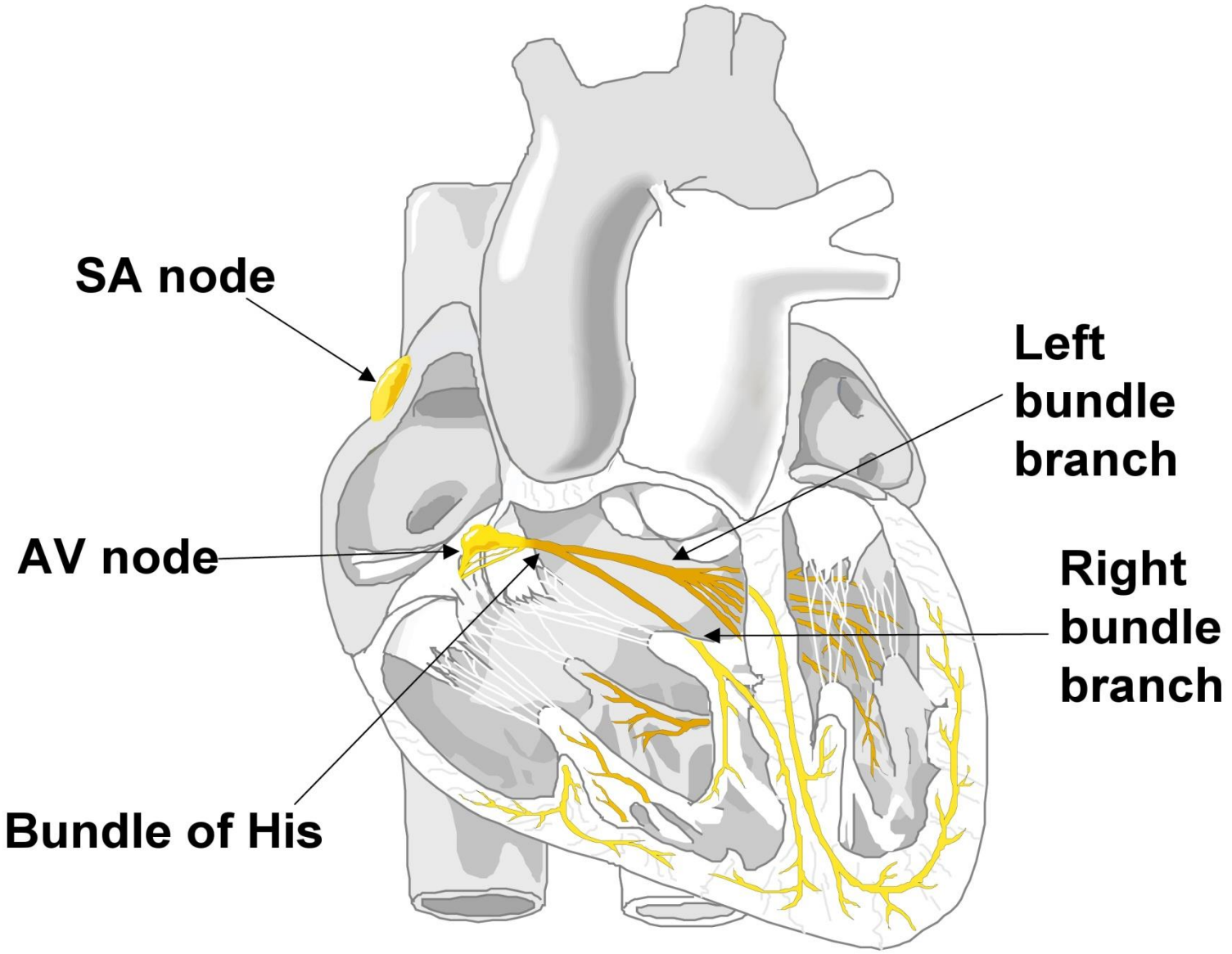
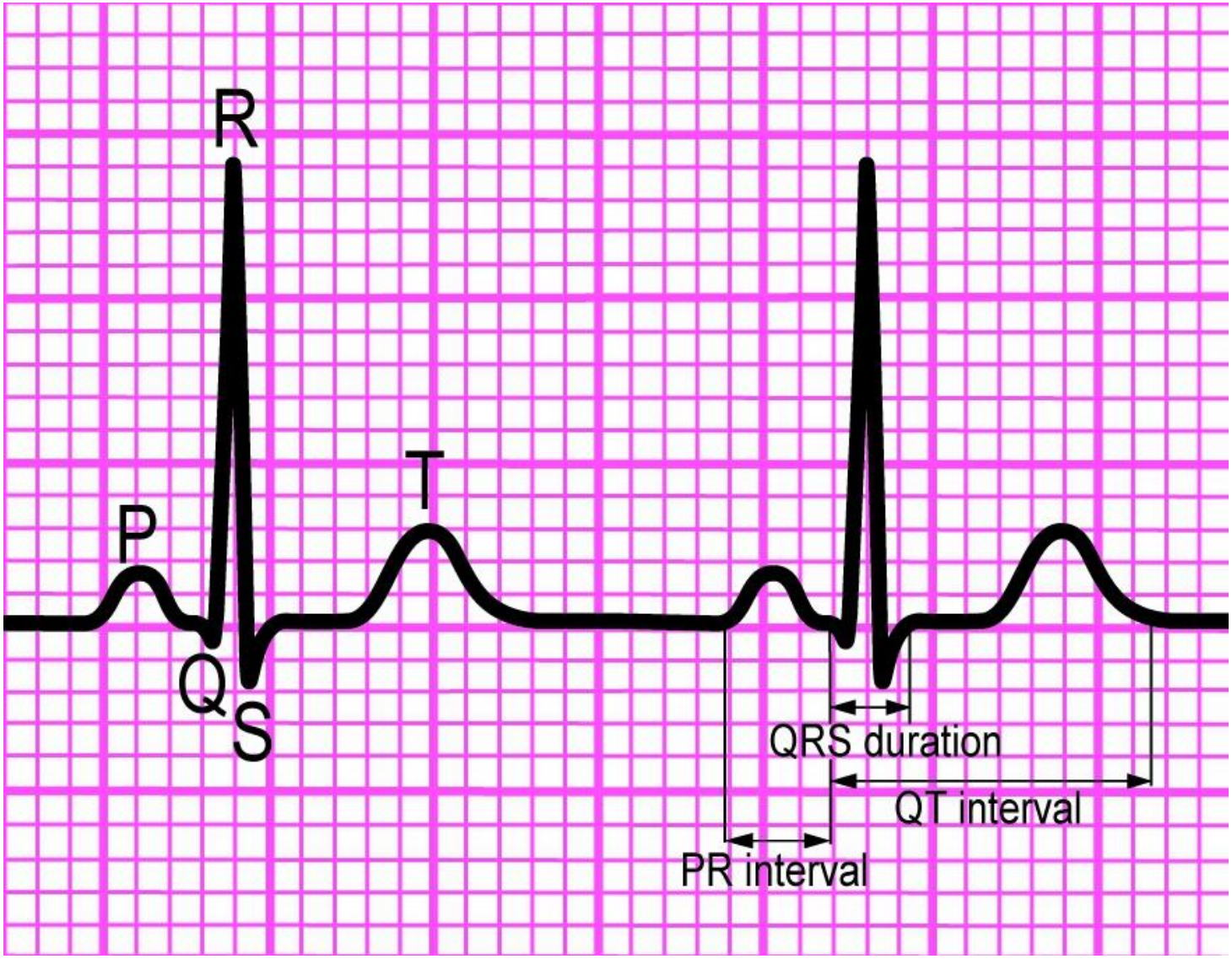
Bradycardia,
Cardiac Pacing and Drugs

Learning outcomes

At the end of this workshop you should:

- Be able to recognise bradycardia and differentiate between the different degrees of heart block
- Understand the principles of treating bradycardia
- Understand the indications for cardiac pacing
- Be aware of the different methods available for cardiac pacing
- Know how to apply non-invasive, transcutaneous electrical pacing safely and effectively


SA node
Left bundle branch
AV node
Right bundle branch
Bundle of His


R
T
P
Q
S
QRS duration
QT interval
PR interval

How to read a rhythm strip

1. Is there any electrical activity?

How to read a rhythm strip

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2. What is the ventricular (QRS) rate?
3. Is the QRS rhythm regular or irregular?
4. Is the QRS width normal (narrow) or broad?

How to read a rhythm strip

1. Is there any electrical activity?

2. What is the ventricular (QRS) rate?

3. Is the QRS rhythm regular or irregular?

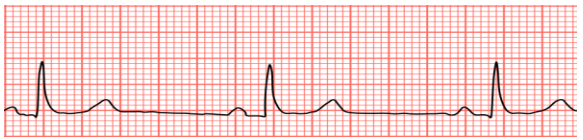
4. Is the QRS width normal (narrow) or broad?

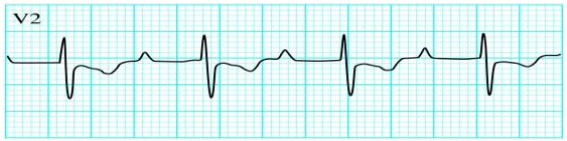
5. Is atrial activity present?
   (If so, what is it: P waves? Other atrial activity?)

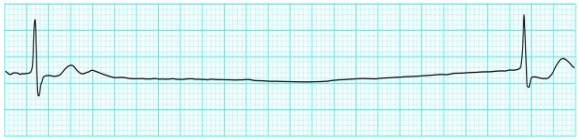
6. How is atrial activity related to ventricular activity?

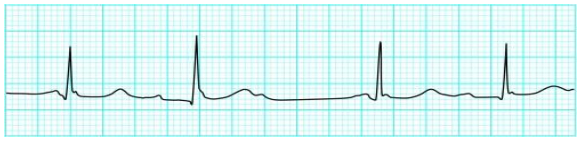
Bradycardia algorithm

Includes rates inappropriately slow for haemodynamic state









- Assess using the ABCDE approach
- Give oxygen if appropriate and obtain IV access
- Monitor ECG, BP, SpO_2, record 12-lead ECG
- Identify and treat reversible causes (e.g. electrolyte abnormalities)

Adverse features?
- Shock
- Syncope
- Myocardial ischaemia
- Heart failure

YES

NO

Atropine
500 mcg IV

Satisfactory response?

YES

NO

Interim measures:
- Atropine 500 mcg IV repeat to maximum of 3 mg
- Isoprenaline 5 mcg min^{-1} IV
- Adrenaline 2-10 mcg min^{-1} IV
- Alternative drugs *

OR
- Transcutaneous pacing

Risk of asystole?
- Recent asystole
- Mobitz II AV block
- Complete heart block with broad QRS
- Ventricular pause > 3 s

YES

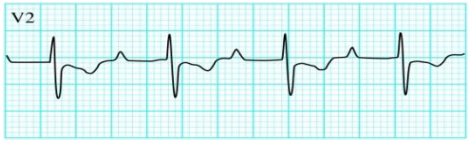
NO

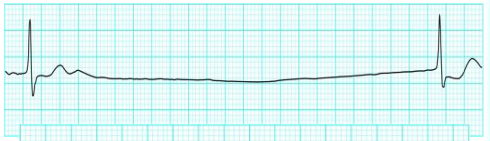
Seek expert help
Arrange transvenous pacing

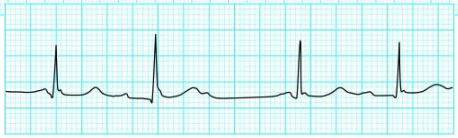
Observe

***Alternatives include:**
- Aminophylline
- Dopamine
- Glucagon (if beta-blocker or calcium channel blocker overdose)
- Glycopyrrolate can be used instead of atropine

Adult bradycardia







Assess with ABCDE approach

↓

Give oxygen if appropriate and obtain IV access

↓

Monitor ECG, BP, SpO_2, record 12-lead ECG

↓

Identify and treat reversible causes e.g. electrolyte abnormalities

↓

Evidence of life threatening signs?

- Shock
- Syncope
- Myocardial ischaemia
- Heart failure

YES

↓

Atropine 500 mcg IV

↓

Satisfactory response?

YES → **Risk of asystole?**

- Recent asystole
- Mobitz II AV block
- Complete heart block with broad QRS
- Ventricular pause > 3 s

NO

↓

Interim measures:

- Atropine 500 mcg IV repeat to maximum of 3 mg
- Isoprenaline 5 mcg min^{-1} IV
- Adrenaline 2–10 mcg min^{-1} IV
- Alternative drugs*

or

Transcutaneous pacing

↓

Seek expert help

↓

Arrange transvenous pacing

NO

↓

Risk of asystole?

- Recent asystole
- Mobitz II AV block
- Complete heart block with broad QRS
- Ventricular pause > 3 s

YES → (to Interim measures)

NO → **Observe**

* **Alternatives include:**

- Aminophylline
- Dopamine
- Glucagon (if beta-blocker or calcium channel blocker overdose)
- Glycopyrrolate can be used instead of atropine

Case study

Clinical setting and history

- 60-year-old man referred to admissions unit by GP
- Long-term history of heart disease
- Feeling light-headed and breathless

Clinical course

- ABCDE
  - A : Clear
  - B : Spontaneous breathing, rate 18 min^{-1}
  - C : Looks pale, P 45 min^{-1}, BP 90/50 mmHg, CRT 3 s

Initial rhythm?

  - D : Alert, glucose 4.5 mmol l^{-1}
  - E : Nil of note

What action will you take?

Case study (continued)

Clinical course

- No response to atropine
- Patient becomes more breathless, cold, clammy and mildly confused
- Change in rhythm
- ABCDE
  - A : Clear
  - B : Spontaneous breathing, rate 24 min^{-1}
    widespread crackles on auscultation
  - C : Looks pale, HR 35 min^{-1}, BP 80/50 mmHg, CRT 4 s
  - D : Responding to verbal stimulation
  - E : Nil of note

What will you do now?

Case study (continued)

- Consider need for expert help
- Prepare for transcutaneous pacing
- Consider percussion pacing as interim measure
- Confirm electrical capture and mechanical response once transcutaneous pacing has started

Case study (continued)

Atropine

Indication

- Symptomatic bradycardia

Contraindication

- Do not give to patients who have had a cardiac transplant

Dose

- 500 mcg IV, repeated every 3 - 5 min to maximum of 3 mg

Actions

- Blocks vagus nerve
- Increases sinus rate
- Increases atrioventricular conduction

Side effects

- Blurred vision, dry mouth, urinary retention
- Confusion

Case study (continued)

Adrenaline

Infusion of 2-10 mcg min^{-1} titrated to response

OR **Isoprenaline** infusion 5 mcg min^{-1} as starting dose

OR **Dopamine** infusion 2-5 mcg kg^{-1} min^{-1}

Any questions?

Summary

You should now:

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Advanced Life Support Course
Slide set