ELECTIVE (SSC5b) REPORT (1200 words)

A report that addresses the above four objectives should be written below. Your Elective supervisor will assess this.

How does the management of manifestations of cardiovascular disease within the Emergency Department differ between Australia and the UK?

Introduction

There are a large number of manifestation of cardiovascular disease that present to the emergency department some of these may include: Acute coronary syndromes, acute heart failure, decompensated chronic heart failure, atrial fibrillation, stroke, pulmonary embolism, deep vein thrombosis and more. As this would be a lot to cover I narrowed down my focus to Acute Coronary Syndrome (ACS) and compared how this is managed in the United Kingdom and Australia.

Acute Coronary Syndrome (ACS) Management

Acute coronary syndrome encompasses a spectrum of presentations caused be reduced blood flow to the heart. It includes Unstable angina, Non-ST elevation Myocardial Infarction (NSTEMI) and ST elevation Myocardial Infarction (STEMI).The most common symptom of ACS is central/ left sided crushing chest pain that may radiate to the left arm or jaw. Some patients don't experience any chest pain this is more common in Women, Diabetics and the Elderly. Other symptoms may include dyspnoea, sweating, nausea and/or vomiting; patients may appear clammy or present with symptoms caused be complications of ACS e.g. heart failure. Patients can be stable or unstable (1).
Initial investigations and management is the same in both countries. The most important diagnostic investigations being an ECG and Troponins. Initial management includes Morphine and Oxygen (as needed);Nitrates (unless hypotensive) and Aspirin 300mg. All patients presenting with ACS should be referred to cardiology or the medics (2,3).

STEMI

To meet the criteria for a STEMI a patient must have these 3 criteria
1. ST elevations
   >1mm in all leads except V2 and 3
   V2 and 3 - >2 in men over 40, >2.5 in men under 40 and >1.5 in women
2. Present 2 contiguous leads
3. Clinical picture compatible with myocardial ischaemia (e.g. raised troponins, symptoms of ACS) (4).

On top of this new LBBB should be treated as a STEMI. If there is uncertainty as to weather it is new or old it should be treated new(2, 3).

UK

In the UK patient should be offered primary percutaneous coronary intervention (PCI) if they have presented within 12 hours of the symptoms onset and it can be delivered within 120 minutes. A patient may also be offered primary PCI if they present after 12 hours and there is evidence of cardiogenic shock or ongoing ischaemia. If PCI is not possible within 120 minutes then thrombolysis unless there are contraindications. If undergoing thrombolysis patients should also be given an antithrombin. ECG should be repeated at 60-90 mins, if there is persistent ischaemia then PCI should be done immediately, if successful PCI should be considered during admission(2).
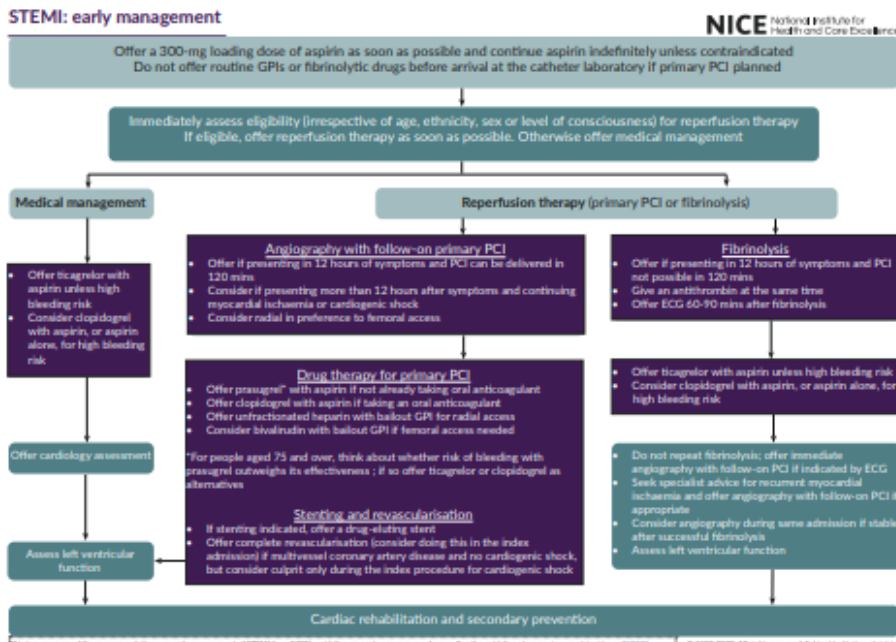
Figure 1. Diagram showing NSTEMI/Unstable angina: early management protocol produced by NICE. Available from (2)

Australia

Guidelines for STEMI management in Australia are very similar with some minor differences. In Australia a patient may be offered primary PCI if the symptoms have been present for less than 12 hours and PCI is possible within 90 minutes, 30 minutes less than the UK guidelines (2, 3).

The Australian Guidelines also stipulate that thrombolysis should be done within 30 minutes, something not mentioned in the UK guidelines. As in the UK, PCI is recommended if ECG has not resolved in 60-90 minutes, but guidelines also recommend that even if successful patients should have PCI within 24 hours (3).

NSTEMI/Unstable Angina

In both NSTEMI and Unstable Angina there is no ST elevation or LBBB on ECG. What is used to differentiate between the two is the troponins. In an NSTEMI troponins are raised, whereas in unstable angina troponins are normal (4).

UK

In patients with an NSTEMI/unstable angina the management pathway is a bit more complicated. If the patient is unstable then immediate PCI should be offered. If they are stable they should be given fondaparinux or unfractionated heparin and their Global registry of Acute Coronary Events (GRACE) score should be calculated in order to determine further management(5).

Those with a 6 month predicted mortality over 3% according to their GRACE score should be offered PCI within 72 hours. If <3% then conservative management with dual antiplatelet therapy should be considered. Revascularisation with PCI or CABG may or may not be done depending on clinical indication, all patients presenting with any ACS should be referred to the cardiology team (5).
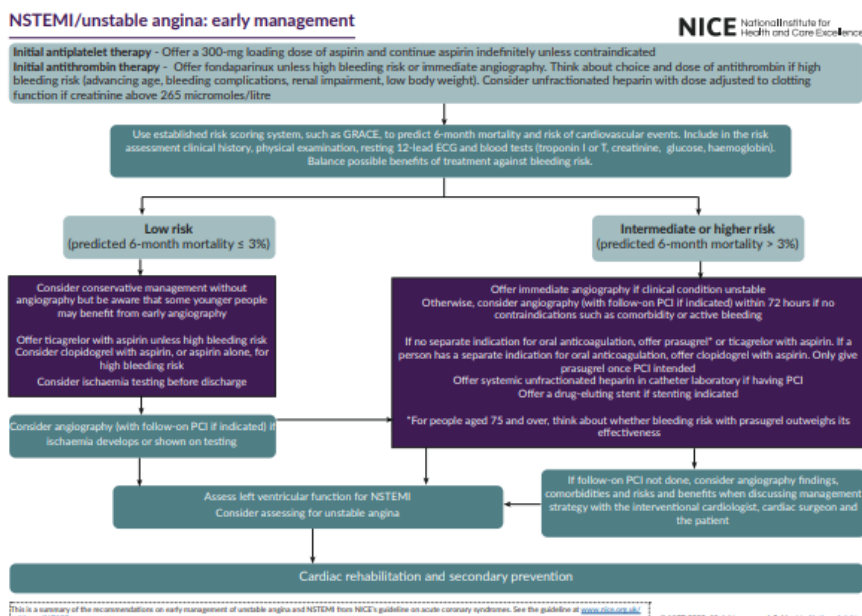

Figure 2. Diagram showing NSTEMI/Unstable angina: early management protocol produced by NICE. Available from (5)

Australia

As in the UK unstable patients receive immediate PCI and stable patients are risk stratified into to determine further management, again often using the GRACE score. However, patients are divided in to low, intermediate, high risk categories. High risk patients should receive PCI within 24 hours of admission and those with intermediate risk within 72 hours of admission. As in the UK the management of low risk patients with NSTEMI/Unstable angina is more patient based(3).

Provisions for PCI

Because of their differences in the population and geography it is hard to make a direct comparison of PCI provision between Australia and the UK. Focusing on Queensland most of the population is concentrated on the east coast, therefore so are the PCI centres. If we look at the proportion PCI centres for the population there are more PCI centres for the population in the UK. Although in Queensland all of these centres are available 24hrs for emergencies, this is not the case in the UK (6-11).

If we also look at how many PCI centres there for the area. Each PCI centre in QLD theoretically covers a 100 times greater area compared to the UK. However again its not that simple as in QLD most of this area is sparsely populated with the state being 7x bigger than the UK. In these areas people may be far from PCI centre, but this is not the majority of the population. Further travels distances could contribute to the proportionally lower PCI performed in Queensland (6-11).

CATEGORY	QUEENSLAND	UNITED KINGDOM
SIZE (KM2)	1,727,000 (6)	244,820 (9)
POPULATION (APPROX.)	5, 586, 972 mil (7)	67 mil (10)
NUMBER OF PCI CENTRES	8 (2022) (8)	118 (2022) (11)
POP/PCI CENTRES	1 per 640,000 people	1 per 567,796 people
AREA/PCI CENTRES	1 per 215,379 km2	1 per 2,055 km 2
NO OF PCI PER YEAR	4818 (2022) (8)	100,29 (11)
NO PCI PER CENTRE	602.25	849.949
NO PCI PER POPULATION	1 per 1071 people	1 per 668 people

Table 1. Table displaying size, population, PCI centres PCI start between Queensland and the UK for comparison. Data collated from a variety of sources (6-11).

Health Inequities

In Australia there are large health inequities between Indigenous Australian and non-indigenous Australians. Aboriginal and Torres Strait Islanders make up 4.6% of the population in Queensland but 7.6% of PCI cases, as they are overrepresented in cases of PCI they are also likely represented on cases of ACS and therefore also cardiovascular disease on the whole. Indigenous patients are also on average 11 years younger at the time of ACS than Non-indigenous patients. Indigenous Australians may be more likely to experience barrier to accessing healthcare than non-indigenous Australians. All these factors represent significant health inequities which should be addressed (8).

Conclusions

Management of ACS protocol between the UK and Australia is widely the same with some minor differences particularly in surrounding timing that PCI should be given. It is difficult to make direct comparisons between the provision of PCI between the UK and Australia as they are very different environments. The large area and relatively small population of Australia represents a challenge access to PCI centres particularly in remote areas which may be the distance of a whole country from the nearest PCI centre (1-11). Making comparisons myself from what I have seen in both countries, I did not notice any differences in the Management of ACS between Australia and UK. Something I did find hard was Australia using more brand names for medications, this was something that took some adapting to, and I found myself constantly learning new ones throughout the placement.

Bibliography

1. Nickson, C. (2021) *Acute coronary syndromes*, *Life in the Fast Lane • LITFL*. Available at: https://litfl.com/acute-coronary-syndromes/ (Accessed: 14 May 2024).

2. NICE (2020)*Recommendations: Acute coronary syndromes: Guidance* Available at: https://www.nice.org.uk/guidance/ng185/chapter/Recommendations#stemi-early-management (Accessed: 14 May 2024).

3. Chew, D.P. *et al.* (2016) 'National Heart Foundation of Australia & Cardiac Society of Australia and New Zealand: Australian clinical guidelines for the management of acute coronary syndromes 2016', *Heart, Lung and Circulation*, 25(9), pp. 895–951. doi:10.1016/j.hlc.2016.06.789.

4. Thygesen K, Alpert JS, Jaffe AS, *et al* (2018) Fourth universal definition of myocardial infarction. Glob Heart. 2018 Dec;13(4):305-38.

5. NICE (2020)*Recommendations: Acute coronary syndromes: Guidance*. Available at: https://www.nice.org.uk/guidance/ng185/chapter/Recommendations#nstemi-and-unstable-angina-early-management (Accessed: 14 May 2024).

6. Queensland Government (2017) *Interesting facts about Queensland*, Available at: https://www.qld.gov.au/about/about-queensland/statistics-facts/facts (Accessed: 14 May 2024).

7. Queensland Treasury (2024) *Queensland Population Counter*, *Queensland population counter | Queensland Government Statistician's Office, Queensland Treasury*. Available at: https://www.qgso.qld.gov.au/statistics/theme/population/population-estimates/state-territories/qld-population-counter (Accessed: 14 May 2024).

8. Queensland Cardiac Clinical Network (2022)*Queensland Cardiac Clinical Network Queensland Cardiac Outcomes Registry 2022 Annual Report Queensland Cardiac Clinical Network Queensland Cardiac Outcomes Registry 2022 Annual Report Interventional Cardiology Audit*. Available at: qcor-2022-annual-report-interventional.pdf (clinicalexcellence.qld.gov.au)

9. Office for National Statistics (2023) *Standard Area Measurements (latest) for administrative areas in the United Kingdom*, *Open Geography Portal*. Available at: https://geoportal.statistics.gov.uk/datasets/ons::standard-area-measurements-latest-for-administrative-areas-in-the-united-kingdom/about (Accessed: 14 May 2024).

10. Sophie Gilbert-Johns, R.M. (2022) *Overview of the UK population: 2020*, *Overview of the UK population - Office for National Statistics*. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/articles/overviewoftheukpopulation/2020 (Accessed: 14 May 2024).

11. British Cardiovascular Intervention Society (2020) *NATIONAL AUDIT OF PERCUTANEOUS CORONARY INTERVENTION (NAPCI)*. Available at: https://www.hqip.org.uk/wp-content/uploads/2020/12/National-Audit-of-Percutaneous-Coronary-Intervention-2020-Summary-Report-FINAL.pdf (Accessed: 14 May 2024).