

Elective Report - Cardiac Care Unit, Vancouver

General Hospital – April 2014

1) *In terms of morbidity and mortality, discuss the impact of acute coronary syndromes on the local population of Vancouver, British Columbia*

Acute coronary syndromes (or ACS) are a spectrum of conditions that present with chest pain resulting from a lack of perfusion to the myocardium. These include STEMI, NSTEMI and unstable angina.

According to the Canadian Institute for Health Information, the *Hospitalised Acute Myocardial Infarction Event Rate* for British Columbia in 2011 was 165 (age standardised per 100,000) [1]. This includes all new admissions to hospital with acute myocardial infarction and re-admissions with AMI if they are more than 28 post-discharge [2]. Men alone scored 239 and women 97 [1]. These figures have remained fairly stable since 2007.

In order to give the above figures some context; a comparable statistic for the next leading cardiovascular disease, stroke, was 119 (age standardised per 100,000) in 2011. [1]

The *30-Day Acute Myocardial Infarction In-hospital Mortality Rate* for both sexes for 2011 was 7.0 (age standardised per 100,000). Notably, this has decreased from 12.7 in 2003. [1]

The above statistics do not take into account pre-hospital deaths due to MI or patient's with MI that do not present to healthcare services.

The prevalence is so high due to the increasing prevalence of the reversible risk factors associated with ACS.

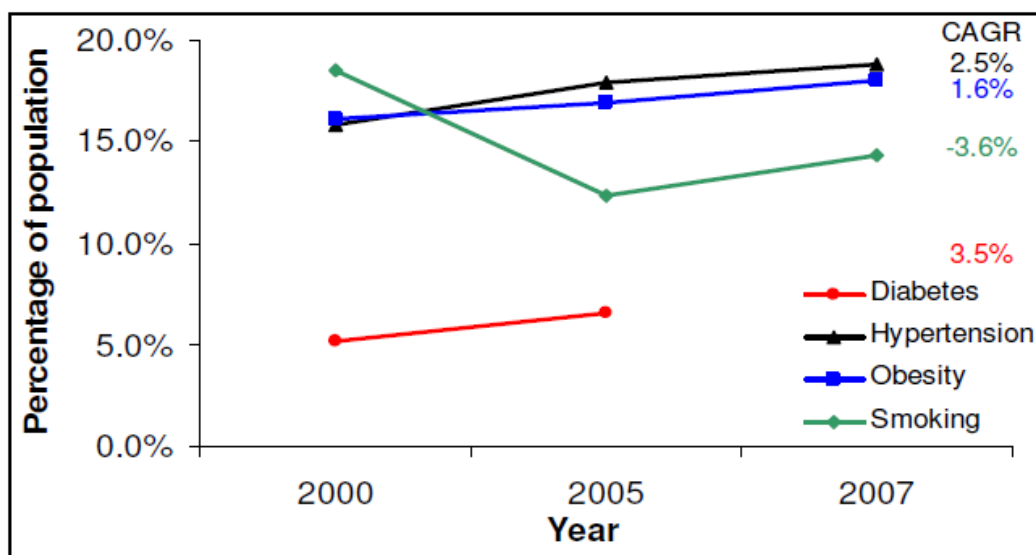


Figure 1: Prevalence of risk factors associated with CAD in Canada from 2000 – 2007 [3]

Equally, increasing age is a major risk factor for ACS and the Canadian population has an increasing life expectancy, these events will be increasingly common.

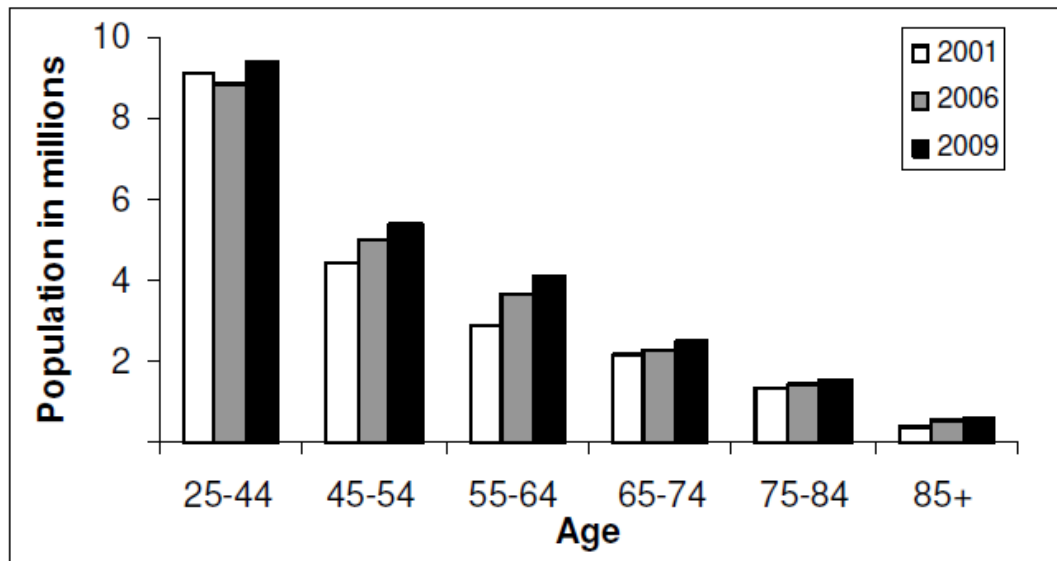


Figure 2: Canadian population age plot (2001 – 2009) based on census data [1]

The total number of hospitalised ACS events from 2008-2009 in British Columbia was 109,100 with 21,500 deaths. [1]

- 2) Describe how services are organised and delivered for patients with acute coronary syndromes in British Columbia

The management of patients with suspected ACS is a logical process that uses history-taking, clinical examination, laboratory results, electrocardiography and demographic epidemiology to synthesise a risk that estimates the likelihood of underlying coronary artery disease. The patient is then managed accordingly; tailoring the subsequent investigation to their pre-test likelihood of CAD. This reduces the number of unneeded invasive tests whilst minimising false negative discharge rates which have historically been a problem [3].

All patients with an appropriate history and new ST-elevation or LBBB meeting appropriate criteria on ECG should be immediately admitted and treated with a view to re-establishing perfusion. [4] In a larger regional hospital like VGH these patients will typically be sent to the *Cath Lab* and managed with percutaneous coronary intervention. In smaller centres, the patient may undergo thrombolysis with the option to transfer for rescue PCI.

Patients without ST-elevation but with either an appropriate history, raised cardiac biomarkers or haemodynamic compromise should be admitted.

Risk scores such as GRACE and TIMI can be useful adjuncts to the risk stratification of ACS patients; however it is important the clinician is aware of their limitations and uses them in combination with other sources of information.

3) Improve my ability to recognise and manage the acute complications of myocardial infarction

Left ventricular failure is seen in about 25% of myocardial infarctions. The clinical picture seen with both increased back-pressures (“congestive”) and with decreased forward systolic pressures (“poor perfusion”) should be considered.

- Signs of increased filling pressure: Raised JVP, S3, crackles, basal dullness 2^y pleural effus, hepatomegaly, ascites, jaundice
- Signs of impaired systolic function: Narrow pulse pressure, cold and clammy extremities, pulsus alternans, evidence of end organ dysfunction

These patients should be diuresed and given pharmacological agents to reduce their afterload such as IV NTG or a short-acting ACE-i. Inotropes such as dobutamine may be required if signs and symptoms persist. [5]

Up to 20% of MI patients may develop heart block over their clinical course because the right coronary artery typically supplies the AV node. High-degree AV block can occur abruptly even if not present upon presentation. Medically these patients can be managed with atropine or aminophylline although some will require pacing. [5]

Mechanical complications of MI are relatively uncommon with an incidence of less than 1% each, they tend to occur a few days after the initial insult. Free wall rupture is more common in larger MIs and tends to present drastically with tamponade or hypotension. Volume resuscitation and pericardiocentesis or surgery are likely to be required. VSDs are usually detected upon auscultation with a harsh pansystolic murmur and often a thrill. Medically they are managed with diuretics, vasodilators and inotropes. They may require surgery. Papillary muscle ruptures are more common with inferior territory MIs and often present with a new murmur. Management is similar to the above. [5]

One of the most seriously complications of ACS and one of the primary reasons these patients are monitored in the CCU with telemetry is the risk of life-threatening arrhythmias such as VF and VT. Increasing beta-blockers as tolerated and repleting potassium and magnesium reduces the likelihood of these rhythms occurring. [5]

4) Reflect on how the elective placement has prepared me for life as a foundation doctor in the UK. Has it changed my future career aspirations?

I believe this placement has significantly improved my preparedness to be a junior doctor in the UK. From the first day of the placement I was given patients to review and follow-up management with. Being given the opportunity to provide holistic care like this is very different from my previous patient clerkings as a medical student and much closer to the work I will shortly be required to do. I feel my skills in examining the cardiovascular system has improved significantly, in terms of being able to describe more accurately the signs I identify and put them into a clinical context. I am much more confident at estimating a patient’s volume status and describing murmurs. One of the main criticisms I received from seniors at VGH was that my management plans could be improved; I have endeavoured to do this in the latter half of my placement. I am very interested in Cardiology and seriously considering an application to do Core Medical Training following the foundation years.

References

[1] ***Heath Indicators Interactive Tool***. Canadian Institute for Health Information. Available online at <http://www.cihi.ca/hirpt/search.jspa>. Last accessed 27/04/2014.

[2] ***Health Indicators 2013: Definitions, Data Sources and Rationale***. May 2013. Canadian Institute for Health Information.

[3] ***A clinical prediction rule for early discharge of patients with chest pain***. Christenson J, Innes G, McKnight D, et al. *Ann Emerg Med* 2005;47(1):1-10.

[4] ***Acute Chest Pain – Evaluation and Triage***. Guidelines and protocols advisory committee. November 2008. Available online at http://www.bcguidelines.ca/guideline_chestpain.html. Last accessed 27/04/2014.

[5] ***Pocket Medicine, Massachusetts General Hospital Handbook of Internal Medicine***. Sabatine M et al. 2011, Lippincott Williams & Wilkins.