The Future of Cardiovascular Nursing

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Our Critical Care Unit 13 beds – 6 CCU/7 ICU- HDU beds
Cardiovascular Suite- ‘Cath Lab’
Cardiology/Telemetry beds on Wards
Cardiac Rehabilitation
Cardiovascular Disease:

- 18 million deaths per year attributed to Cardiovascular disease
- Is the number one cause of death globally
- This is despite current advances in preventative measures, diagnosis and treatment.
- Remains the number one cause of death globally despite significantly improved survival rates.
Is your area of nursing practice in:

- Surgical ward
- Medical ward
- Rehabilitation
- Operating suite
- Aged care
- Palliative care
- Oncology
- Anaesthetics
- Cardiac ward
Cardiovascular Nursing: a definition

- A nursing specialty that works with patients who suffer from various conditions of the cardiovascular system.
Cardiovascular disease:

A disease process that involves the heart and blood vessels. For example
- Ischaemic heart disease
- Coronary heart disease
- Angina
- STEMI/NonSTEMI
- Hypertension
- Cardiomyopathy
- Congestive cardiac failure
- Cardiac arrhythmia
- Valve disease
- Myocarditis
- Peripheral vascular disease
- Pulmonary emboli or venous thrombosis.
Mr. Ed, 79 years. Presents to ED via his GP with 'falls for investigation'

Past History:
- Hypertension
- IHD- STEMI intra op in 2015 – no angio at the time
- Type 2 diabetic
- PVD
- TIA’s
- Obesity
- Hypercholesterolemia
- Ca Bowel- Hartman’s in 2015
- Exsmoker- quit in 2015 45 pack year
- Socially isolated- Widower

Admitted for ongoing falls at home.
Mr. Ed’s Risk Factors

- Hypertension
- Type 2 diabetic
- Obesity
- Hyper cholesterol
- Smoker
- Age
- Gender
Hypertension:

- Defined as elevation in either systolic blood pressure (SBP) or Diastolic Blood Pressure (DBP) using a range between 100 and 140 systolic and 60-80 diastolic.

- Hypertension (HTN) = BP > 140/90 resting.

- Hypertension is the most common risk factor in the development of cardiovascular disease in both developing and developed countries.
From 2011-12

Almost 1/3 (31.6%) of all adult Australians had hypertension
21.5% had hypertension and 10.1% had normal BP but were on medication for it.

Almost half of these (48.8%) self report a current and long term heart or circulatory condition.
Men are more likely to have HTN than women -34.1% compared to women 29.1%
Significantly more prevalent at older ages. (87.7% of people over the age of 85 have HTN)
Causes of Hypertension: primary and secondary

- Linked to family history, obesity, stress, excess sodium dysfunction, sympathetic nervous system dysfunction, genetic and environmental.

- Primary:
  - 90-95% of all cases of hypertension.
  - Genetic predisposition of increased sympathetic nervous system activity
  - Variations in the renal sodium absorption - genetically influenced
  - Dysfunction of renin- angiotensin aldosterone system
  - Impaired vascular responsiveness.
Secondary causes-

- Linked to diseases of kidney, endocrine system, vascular system, lungs and central nervous system
  - E.g.- Renal Vascular disease
  - Renin producing Tumors
  - Primary sodium retention
  - Hypothyroidism
  - Cushing’s syndrome
  - Quadriplegia
  - Increased ICP
  - Diseases of the aorta
  - Pregnancy induced HTN
Organ damage from Hypertension:

- Left Ventricular Hypertrophy
- Angina +/- myocardial ischaemia and infarction
- Heart Failure
- Stoke and TIA
- Chronic kidney Injury
- Peripheral vascular disease
- Retinopathy
Only 50.1% of people have their Hypertension under control, i.e. < 140/90

**WHY?**

- Poor access to health care
- Poor access to or lack of financial ability to access medication
- Lack of patient adherence to long term therapy
- Medication affects quality of life
- Immediate benefits are not obvious to the patient. Pts are usually symptomatic
- Therapeutic inertia- failure of medical providers to increase or change therapy in the setting of poorly controlled BP
- Remains the most common risk factor for heart attack and Stroke.
Obesity:

“In 2010, 35.7% of all adults over 18 years of age were obese (body mass index (BMI) equal to or greater than 30 kg/m²) compared to 12% of all adults in 1991 and 19.9% in 1998.”
Smoking:

- Sobering statistics:
- ‘Smoking one packet of cigarettes a day increase our coronary heart disease risk about 3-4 fold’.
- Smoking is still recognized as the largest single preventable cause of death and disease in Australia.
- Associated with increased risk of heart disease, stroke, cancer, emphysema, bronchitis, asthma, renal disease and eye disease – to name a few.
Type 2 Diabetes

- Diabetes (both types) – present in approx. 5% of Australians.
- Both types relate to the lack of available insulin to cells – either through production or resistance to insulin by the cells.
- Type 2 Diabetes accounts for 95% of all diabetics.
- 75% of all diabetics will die of cardiovascular disease.
- Diabetics have a 2-4 fold increased risk of developing cardiovascular disease.
- Diabetics have a 4 fold increase in mortality from Cardiovascular disease.
Age and Gender:

- Age is the most significant non-modifiable risk factor that affects the development of cardiovascular disease and mortality from it.
- 75% of all deaths from CVD are in people over 75 years with just 5% in people under 55 years.
- Cardiovascular disease is more common in men than women.
- Risk in both sexes increases with age but the increase is sharper in women.
- Changes post menopausal - Role of oestrogen as cardio-protective
Dyslipidaemia:

- Strong correlation between total cholesterol and low density lipoprotein (LDL) and incidence of CVD and heart disease in Men and Women.
- Complex relationship between total cholesterol, LDL (bad cholesterol), HDL (good cholesterol), triglycerides and lipoproteins.
- Doctors talk in terms of ratio between total to HDL Cholesterol
- Statins still used but use is under review.
Mr Ed is admitted to 4 North for Falls investigation and telemetry monitoring.
Telemetry monitoring:

- Continuous electrocardiographic monitoring
- Pt not required to be ‘hard wired’ to a monitor.
- ECG trace sent to CCU for continuous observation and monitoring.
Advantages /disadvantages of Telemetry monitoring:

Advantages:
- Cost effective method of increasing “monitored beds”
- Ward bed is approximately $600 a day, CCU bed $2,500 a day and ICU $5,500 a day.
- Allows the patient to mobilise and simulate normal daily activity.
- Keeps patients out of Coronary Care Unit - limited resource.

Disadvantages:
- In the event of arrhythmia – exact patient location is unknown
- Time delay in responding to catastrophic arrhythmia
- Labour intensive for Telemetry nurse
- Added work load for ward nurses
On admission and assessments, Mr Ed describe central chest pain 5/10, radiating to his jaw.

- Telemetry phoned- nil abnormality seen
- ECG normal,
- History of pain is of concern

Ward nurses manage pain as per protocol
Cardiology review Mr Ed and decide to take him to the Cardiovascular suite- (Cath lab) tomorrow for an angiogram.
Chest pain assessment: PQRSTa method

- **P**: position - where is the pain? Precipitating factors, is it constant/relieved by rest, breathing or movement.
- **Q**: Quality - tightness, heaviness, pressure, constricting, burning, sharp, dull
- **R**: Region - retrosternal/radiating to anyway - jaw, arm, back, epigastric
- **S**: Severity - ranges from ‘worse pain ever to ‘mild pain’. Use of numeric scale to score pain - 0-10
- **T**: Timing - last seconds to in excess of 20 minutes - when did it start and is it continuous?
- **A**: Aggravating/alleviating and associated - what makes the pain better/worse. Are there any other symptoms you would like to tell me about i.e. nausea/shortness of breath. Is there anything else you feel you need to tell me.
Aim of chest pain management:

- Assessment
- Analgesia
- Rest
- Anti-ischaemic therapy
- Anti-platelet therapy
- anti-coagulant therapy
- Plaque stabilisation
- Reperfusion/revasculization.

All management is aimed at reducing oxygen demand and prevention of further clot formation.
Treatment pathways

Typical management plan might include:
- ECG- ST segment changes/rate and rhythm disturbances
- CXR- cardiomegaly? Other causes of chest pain.
- IV cannulation- administration of medication/ Bloods- U&E, troponin. FBE
- O2 ? – titrated to Sa02 of less than 94%
- Medications:
  - Anginine- vasodilator- decreases preload and afterload and workload of heart and dilates coronary arteries.
  - Aspirin-platelet aggregation inhibitor
  - Morphine- analgesia, anti- anxiolytic
  - Clopidogrel – platelet aggregation inhibitor
  - GTN infusion – dilates coronary artery’s- more flow/02 – less pain, BP control
- Treatment options
  - Angiography +/- PCI/CAG’s
  - Thrombolysis.
Other drugs:

- Anti-thrombotic agents: Clopidogrel or Prasugrel
- Fibrinolytic agents: Tenectoplas, Metalyse
- Fibrinolytic agents: enoxaparin, unfractioned heparin, clexane
- Beta Blocking agents: Metropolol
- Calcium channel blockers: verapamil
- Nitrates: Glycerine Trinitrate
- ACE inhibitors: perindopril
- Non-steroidal – must be avoided.
Off to Cath lab:
Angiography:

- Gives visualisation of the major coronary arteries and direct visual evidence of the presence and extent of impairment of blood flow in the coronary arteries.
- Guides our treatment
- Allows us to ‘fix while we are in there’ = coronary artery balloon angioplasty or insertion of stents. – PCI ( Percutaneous Coronary intervention )
- Risks are very low - mortality is approximately 0.1% and incidence of stroke is 0.7%

https://www.bing.com/videos/search?q=coronary+angiogram&v...
Angiography is not without complications:

- Allergic reaction to Contrast medium – less frequent with modern contrast
- Nephropathy (renal damage) - particularly if previous renal impairment present.
- Big one is vascular site complications such as
  - Bleeding/haemorrhage
  - Haematoma
  - Pseudo aneurysm
  - Trauma of vessel - both access such as femoral and occasionally to the coronary artery's
Two sites used:

- **Femoral artery**
- **Radial artery**

Femoral artery- traditionally been preferred site.

Does have limitations:

- Contraindicated in PVD
- Risk of complications 2-8% after PCI
- Haemostasis after sheath removal time consuming and painful
- FEM STOP device to assist in haemostasis painful and pricey.
- Patients required to remain lying to 30 degrees only for 2 hours.

Problem with CCF, lung disease or back pain
FEM STOP device:
Radial artery site:

- Requires smaller French catheter with images and primary stenting unchanged.
- Has lower complication rates over femoral access route.
- Allows for rapid mobilisation of patient
- Earlier discharge from hospital - $$ saving.
- Haemostasis achieved by use of TR band. (Trans-radial)
Mr Ed has a positive Angiogram!

- 90% LAD proximal stenosis
- 65-70% distal LAD stenosis
- 80% Proximal D1 Stenosis
- Small irregularity in Cx (circumflex)
- RCA – 50% lesion – distal
What to do with this result?

- Coronary bypass surgery?
- Angioplasty with deployment of a stent – drug eluting or Bare metal.
- If acute ischemia (STEMI) with plaque rupture and thrombus formation and revascularization with PCI or Surgery is not available – thrombolysis with Metalyse, tPA, Tenecteplase. – ideally within 60 minutes of pain onset.

  Time = myocardium

Gains from reperfusion strategies are greatest in the first few hours of symptoms.
Mechanical reperfusion strategies:

Why CAG’s over Stenting?
Not our question to answer BUT
- Depends of degree of stenosis
- Number of vessels with stenosis
- Location of stenosis
- Other co-morbidities
- Availability cardiac theatre time
- Condition of patient at the time - ? Shocked state.
Percutaneous Coronary Intervention
PCI

Advantages are:
- Non-invasive
- Quicker return to normal activities of daily living
- Less pain
- Less complications
- Quicker recovery time
- Reduced length of stay - less health care dollars. $$
Drug eluting V’s bare metal stents
Coronary Artery Grafts:

- Still gold standard revascularization therapy.
- Sternotomy/pts on Bypass to bypass heart and lungs- oxygenate and removal of CO2 and to provide pulsatile flow
- Grafts are harvested from
  - Femoral vein
  - Radial artery
  - Internal mammary- left and right.
What's new in CAG’s

MID Cab.
- Use thoracotomy approach and endoscopic technique – uses internal mammary artery

Off pump
- Single vessel grafting- no cardiopulmonary bypass equipment used.

TECAB
- Totally endoscopic coronary artery bypass.

All these are designed to be less invasive, shorten length of stay and reduce complications.
Valve disease

- Either regurgitation – ‘floppy valve’
- Calcified valve
- Rupture of chordae tendenae

Can be ‘repaired’ or replaced

Can be Mechanical or tissue.
- mechanical requires life long anticoagulation
- Tissue valve doesn’t last as long.

Repairs can be done in Cath lab percutaneously or other less invasive ways.
So following successful deployment of a drug eluting stent to his LAD, Mr Ed is taken to CCU.
What’s hot in CCU?

- Constant monitoring for
  - arrhythmia, and treatment of.
  - haemodynamic instability
  - Pain- Restenosis/ischaemia
  - Bleeding.
- 1:2 nurse patient ratio
- Cost is HOT- labour intensive and expensive.
- Cost approx. $ 2,250 (+ PCI/Cath lab costs) a day to keep a person in CCU
Day 2 – Mr. Ed is transferred to 4 North for telemetry monitoring.

- Nurses become Cardiovascular detectives!
- Cardiac Rehabilitation starts the day Mr. Ed walked into the hospital and complained of chest pain.
- Education on risk reduction and behavioral modification
Where to start:

- Resuming physical activity
- Alcohol consumption - how much can I have?
- Resuming sexual intimacy and activity
- Resuming work and leisure activity
- Risk reduction such as smoking.
- Education about Cardiovascular risk factors.
- Education about their condition and what they have had i.e. Drug-eluting stent.
- Education about new medication – Clopidogrel?
- Psychological support
- Diet - lipid lowering, healthy food chart, medication.
- Obesity - Target BMI weight and waist control
  - Waist in men > 102 cm and women > 89 = increased risk of CVD.
  - Target BMI 18.5-24.9 kg/m2

Cardiac Rehabilitation starts AS soon as the patient walks through your doors!
Cardiac Rehabilitation:

Our Cardiac rehabilitation programs should include individualized programs and include information on:

- Exercise
- Smoking cessation
- Nutritional advice
- Emotional support
- Weight and waist control
- Stress management
- Detection of and treatment of depression
- Information surrounding erectile dysfunction related to condition and medications.

Should be multidisciplinary.
The role of Nursing in CVD Risk Mitigation.

Cardiovascular disease accounts for approximately 15% of all health care spending. Compare this to 3% spend on health promotion, disease prevention and risk reduction.

“the key role that nurses play in health promotion, risk reduction and disease prevention are vital to meeting the challenges posed by the global impact of chronic cardiovascular disease. This is even more apparent with the growing threat and burden the disease imposes, especially with a rapidly aging population (including nurses!)”

Thompson-’ Journal of Cardiovascular Nursing.
Points to consider:

- We need to shift our emphasis from illness care to active role in health promotion and disease prevention.
- Self-care and patient empowerment are essential.
- Need to shy away from a ‘one size fits all’ approach.
- Programs need to be team-based and patient-centered.
- Multi-disciplinary team.
- Utilization of community-based programs—‘hospital in the home’ HARP—minimizing impact of disease on the family unit.
Fluery tells us:

“looking at the shift in health care emphasis from illness to wellness necessitates an examination of the goals for health promotion, including individual risk reduction strategies and community based approaches. Individual lifestyle changes alters the choices individuals make about their health without changing the environment in which choices are made. In contrast, community based approaches to health promotion strive to create supportive environments within which health choices are facilitated.”
Reasons for good or poor adherence to programs?

- Differing value on the possession and retention of good health,
- Interpersonal factors- personality
- Medical history and complexity of.
- Individual attitudes,
- Ability?
- Vanity
- Family wishes
- Finances
- Network of family and friends to support through change.
- Organizational factors such as location or setting of program.
As consultants and collaborators across the continuum of care, nurses – of all persuasions- Cardiac, surgical, medical etc. have an important role to play in the shift to prevention and health promotion as educators, community leaders and care givers. Nurses play a central role in detection, prevention, control education and rehabilitation. We need to find our place at the table of policy development and ensure that in the midst of statistics, disease burden, financial constraints, individual patients specific requirements and hospital policy, that the best interests and outcomes for our patients are in the foremost of all our minds.

If we can do this well, we will have achieved our goals.
Thank you.
2. Humphreys, M. eds. 2007, Nursing the Cardiac Patient, Wiley-Blackwell, UK.
5. Olson, K. eds. 2014, Oxford Handbook of Cardiac Nursing, 2nd edn, Oxford University Press, China
References:

