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Nursing and Residential Care

'Heart Failure in Practice - Enhancing Knowledge for Nursing and Residential Healthcare' --Manuscript Draft--

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Short Title:	Heart Failure in Practice
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Abstract:	The aim of this article is to enhance the current knowledge of healthcare staff working in the context of nursing and residential care. Being able to understand the condition and its various aetiologies is one means of better being able to support often vulnerable older adults in practice and also to tailor care to their specific individual needs. Operationally defined.
Response to Reviewers:	Nursing and Residential Care FINAL AMENDMENTS FEEDBACK AND COMMENTARY JANUARY 14th 2020
	<p>Reviewer Comment: There needs to be greater clarity throughout regarding the use of NT pro BNP as part of the diagnostic pathway for heart failure - particularly helpful to rule out heart failure if below 400ng/ml meaning an echo is then not needed. This needs referring to in the Conclusion and also on page 6 where the section on NT pro BNP needs including in the diagnosis section earlier on the page. An ECG is helpful as it usually not normal in HF but the first step in diagnosing HF if the pt has symptoms is the NT pro BNP.</p> <p>Author Response: Many thanks, we have now integrated a degree of greater clarity throughout the article regarding the use of NT pro BNP as part of the diagnostic pathway for heart failure - particularly helpful to rule out heart failure if below 400ng/ml meaning an echo is then not needed. As recommended we have addressed and referred to this specifically on page 6 and in the conclusion. We have also ensured that the section on NT pro BNP has been included in the diagnosis section earlier on page 6 than we had originally included. We have also incorporated a section to reflect the</p>

	<p>use of ECGs where appropriate.</p> <p>Reviewer Comment: The mention of 8 key pharmacological interventions on page 8 needs removing. There are a number of key pharmacological interventions - but not 8.</p> <p>Author Response: Many thanks for pointing this out, we have now corrected this!</p> <p>Reviewer Comment: Page 4 - it is not correct to have a sub title left sided HF (HFrEF) as this is not correct. It is fine to have the title HFrEF and then the paragraph makes sense.</p> <p>Author Response: Many thanks again, we have now corrected this.</p> <p>Reviewer Comment: The next paragraph should be HFpEF (not right sided HF). This terms included right sided HF but also diastolic HF which needs mentioning.</p> <p>Author Response: Many thanks, we have corrected this and also incorporated diastolic HF into this paragraph.</p> <p>Reviewer Comment: The ESC guidelines for hypertension have been referenced not the ESC HF guidelines.</p> <p>Author Response: Many thanks for spotting this – this has now been amended fully.</p> <p>Reviewer Comment: The definition of HF on page 2 needs referencing. I would suggest using a definition from NICE or ESC</p> <p>Author Response: Many thanks, we have now cited and referenced this operational definition, as recommended.</p> <p>We are sincerely grateful for all of the commentary and supportive feedback we have had in relation to this article – many thanks to the reviewers.</p>
Additional Information:	
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Title:

‘CPD Refresher: Coronary Heart Failure in Nursing and Residential Care’

Article:

Journal of Nursing and Residential Care

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Abstract

This paper is presented as a CPD refresher for staff working within the context of nursing and residential care settings. The paper focuses on the high incidence and prevalence rates of heart failure in older adults and contextualises the need for the recognition of symptomology which may be indicative of the need for further diagnostic intervention. An overview of the functional anatomical and physiological changes of the condition are presented, alongside key aetiological factors and pharmacological treatment interventions. The article concludes by considering the high prevalence rates of heart failure in the context of nursing and residential care, necessitating acknowledgement of specific address in relation to improving both quality of life and healthcare outcomes for older adults. Alongside this, the need to increasing the underpinning knowledge of the condition for healthcare workers caring for older people as an imperative means of addressing those still undiagnosed with the condition or whose present lifestyles may predispose them to long term ill health.

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Nursing and Residential Care

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'Heart Failure in Practice - Enhancing Knowledge for Nursing and Residential Healthcare'

Introduction

The aim of this article is to enhance the current knowledge of healthcare staff working in the context of nursing and residential care. Being able to understand the condition and its various aetiologies is one means of being able to better support often vulnerable older adults in practice and also to tailor care to their specific individual needs. Operationally defined, Heart Failure (HF) is a physiological condition which results in an insufficient cardiac output to supply the oxygenation needs of the body (Linden, 2019). When this occurs, affected organs and systems of the body become deoxygenated and depending on the severity of the condition can lead to long term illness and death. The onset of the condition can initially be asymptomatic or in other instances onset can be acute and life threatening (Westaby, 2014). The ageing population evident across the United Kingdom means that seeing more people with heart failure is inevitable for the majority of healthcare workers employed in residential and nursing care. Continuing to learn about developments in the management of the condition is therefore an integral part of professional development, which this article provides a basis for. The specialist heart failure nursing staff who are now employed as a response to this rising need, in conjunction with collaborative care, is also ensuring that awareness of the signs and symptoms of illness can also be more readily detected, which is invaluable in residential care. However not all settings are fortunate to have this level of specialist expertise which establishes the need for enhancing the knowledge of all staff of heart failure in practice.

Epidemiology

The ten most frequent diagnoses of ambulance-transported patients are convulsions, injuries, asthma, congestive heart failure, chest pain, syncope and collapse, otitis media, abdominal pain, cardiac arrest, and respiratory abnormality (Eaton et al, 2019). Heart failure has a mortality rate rivalling that of cancer and within 5 years of diagnosis, 60% of all patients will die of the condition, with 30-40% of all patients dead within one year of clinical diagnosis of the condition (Mejía et al, 2014). For those who remain alive and live with the condition, HF has a negative impact on quality of life, thought to be as a result of the symptom load (breathlessness, fatigue, memory impairment, reduced functional capacity to perform activities of daily living and long term depression that is associated with the lack of ability to concentrate effectively (Garfield et al, 2014). For these reasons alone the quality of prehospital care that patients with heart failure receive is pivotal to their survival and their long term prospects of being able to resume a normal lifestyle.

The statistics of people in the UK suffering from HF are sobering; around 800,000 people are currently living and dying with heart failure in the United Kingdom (Mahmood et al 2014). This number rises exponentially each year due to the ageing population and significantly improved chances of survival following acute myocardial incidents such as heart attacks due to the integration of more effective treatments as they have become available via the National Health Service (NHS) (Valentova and von Haehling, 2014). These statistics demonstrate that inevitably paramedics will care for HF patients and their families and carers at some stage of their role in emergency healthcare practice.

Key Facts

- ✓ Heart failure is a serious and potentially fatal medical condition that occurs as a result of other cardiac problems, in which the heart does not pump efficiently.
- ✓ Heart failure may not be specific to cardiac pathology – it may also develop as a consequence of lung pathologies due to the increased effort of the heart to pump oxygenated blood around the body. A common example is emphysema.
- ✓ Heart failure can be completely without symptoms in the earliest stages of its development.
- ✓ Heart valve disease is a significant manifestation in heart failure, which is incidental to the heart's potential to pump oxygenated blood around the body.
- ✓ Late-stage heart failure can also cause extreme congestion in the lungs and fluid retention throughout the body. Circulation to the lower limbs can be greatly diminished so that the patient appears to have a bluish tinge to their skin at the extremities.
- ✓ In the final stages of heart failure, the heart is no longer able to meet the body's demand for oxygen and death occurs.
- ✓ The aim of medically treating heart failure is to improve characteristic symptoms, slow progression of the disease process and ultimately to prolong the survival of the patient.
- ✓ Whilst managing the clinical symptoms of heart disease is an immediate priority, providing mechanisms of increasing heart function from the point of initial diagnosis is as important in the longer term avoidance of morbidity and mortality.
- ✓ In people diagnosed with heart failure, sudden cardiac death occurs at six to nine times the rate of the general population (Azad and Lemay, 2014).
- ✓ Of newly diagnosed patients under the age of 65, about 80 percent of the men and 70 percent of the women will die within eight years. This death rate rivals mortality statistics for cancer; yet specific palliative care provision for end stage heart failure is limited in comparison.

What is Heart Failure?

Heart failure is the term used to describe either when the heart has lost the ability to pump enough blood around the body to all of the organs and tissues or due to valve dysfunction, which ultimately also deprives the body of oxygenated blood. When it reaches such an extent that insufficient amounts of oxygen are being circulated, these organs and systems cease to function effectively and deoxygenation of the tissues ensues.

Relevance to Nursing and Residential Care

The incidence and prevalence rates of heart failure in older people are significantly higher than in younger populations, whilst an age specific response, in relation to natural senescence may be more appropriate. It is notable that up to 20% of all older adults over the age of eighty years may be experiencing some degree of heart failure (Conrad et al, 2018). As such, the impact of the condition on daily lifestyles of these people can be extensive, especially in instances of recognised co-morbidity, where polypharmacy and the physical and psychological resonance of other conditions takes precedence in relation to their overall quality of life. Despite this, initial aim, management of the

condition is far more extensive in relation to focused attempts to improve existing heart function. In addition to this, older residents are not prioritised in terms of clinical research and as such there is a relatively limited amount of reliable information available in the published literature. The physical access to diagnostic physicians for these older people has long been recognised as being more limited than in the general population since the generalised symptomology of fatigue may well be overlooked unless a clinical emergency arises. Indeed it has historically been reported that a mere 34% of heart failure diagnoses in the elderly occurs following diagnostic testing with ECGs (Hobbs, 2002; Tresch, 2000). In instances where this diagnostic equipment is less available to older people living in nursing and residential care this is an issue for address.

Common Causes of Heart Failure

- Hypertension (high blood pressure, which can subsequently impact on kidney function) (Aronow, Banach and Ahmed, 2014).
- Valve Disease or Damage (which means that the valves cannot effectively maintain the passage of blood flow around the heart) Arden et al, 2014).
- Coronary Arterial Disease, which can lead to Myocardial Infarction (heart attack) (Muhlestein et al, 2014).
- Atrial Fibrillation which impacts upon the incidence rates of cardiac death and the need for the hospitalisation of patients with the atrial fibrillation (An et al, 2018).
- Lung Pathology (which can influence the capacity of the body to receive oxygenated blood to the central and peripheral tissues) (Ginde and Earing, 2018).
- Cardiomyopathy (where the heart muscle loses its capacity to contract and pump blood around the body effectively) (Oluleye, Duval, S and Jain, 2014)
- Drug and Alcohol Abuse (which can lead to cardiomyopathy and elevated blood pressure) (Waldrop and Cohen, 2014).
- Congenital heart disease (defects in the basic anatomical structure and physiological function of the heart, which have been present since foetal development) (Vanderlaan, Caldarone and Backx, 2014).

Recognising Signs and Symptoms of Heart Failure

Recording and analysing past medical history continues to be of great significance in recognising potential signs and symptoms of heart failure (Aghababian, 2019). When insufficient blood can be pumped around the body to fulfil the demands of organs and systems, there is usually a resultant accumulation of fluid in the body's tissues. This condition is called oedema and heart failure that

accompanies this kind of fluid retention is termed Congestive Heart Failure (CHF) (Mandal, 2014). This is largely dependent upon the area of the heart that is being impacted upon by heart failure and this will also determine whereabouts fluid accumulates in the body. To describe left and right sided heart failure is a deliberately simplified mechanism of explaining the pathology of heart failure and the specific terms used in medical practice are actually heart failure with reduced ejection fraction (HFrEF) and heart failure with preserved ejection fraction (HFpEF). Looking at each in turn enables a pragmatic level of how each occurs in practice.

Heart failure with Reduced Ejection Fraction (HFrEF)

When the left ventricle (the section of the heart that is responsible for pumping blood around the body) is not working correctly, blood begins to back up into the large blood vessels of the lungs. This causes something called pulmonary oedema, where blood occupies the lungs and prevents adequate ventilation from occurring (Matthay, 2014). Symptomatically this causes shortness of breath, tiredness and impacts upon the person's functional capacity in their everyday activities. This can also be life threatening in instances where the condition has a sudden onset. Certain anatomical abnormalities and rhythm abnormalities can cause left ventricular failure of the heart (Braunwald, 2013).

Heart Failure with Preserved Ejection Fraction (Hfref)

Where there is failure of the right side of the heart to pump blood into the lungs as it returns back from the body, there is a backup of blood in the right hand side of the heart and the systemic veins. This includes right sided heart failure but also diastolic heart failure. Fluid then builds up in the tissues that cause swelling in the lower limbs and feet (Pradhan, Givertz and Baughman, 2013). Heart valves can have abnormalities that cause this, as well as several lung conditions. The heart often becomes enlarged as a result of its inability to pump blood around the body. The medical term for this is hypertrophy (Dickinson, Chen and Francis, 2014). The walls of the heart become thicker and the chamber of the heart enlarges. The renal systems (kidneys) begin to retain salt and water in an effort to increase the volume of blood and this extra fluid can also cause oedema (Damman et al, 2014). If this perpetuates over the long term, the kidneys weaken and renal failure can ensue.

Diagnosis of Heart Failure

Several factors are taken into consideration before a diagnosis of heart failure can be confirmed and this involves several processes, including:

- **Past medical history:**

Taking a systematic history of the patient is an integral part of any examination process for a doctor and in the case of heart failure patients will provide a necessary insight into the lifestyle

factors that may provide a potential diagnosis or differential diagnosis of heart failure. This process also identifies other medical conditions (called co-morbidities) that might impact on the treatment regimens available to patients following a diagnosis (van Deursen et al, 2014).

- **Clinical signs and symptoms:**

Symptoms that the person presents at their GP surgery with can be important indicators of possible heart failure. Shortness of breath is the most obvious sign, especially when this wakes them in the middle of the night from their sleep or when they are engaging in everyday activities that do not take a great deal of physical exertion (Malik, Gysels and Higginson, 2013).

- **Clinical Examination:**

With regards to clinical diagnosis, practitioners qualified in cardiac examination will listen to the function of the heart and lungs with a stethoscope to see whether there are characteristic signs of heart failure. These include an exceptionally fast heart rate, murmuring of the valves and 'gallops' that confirm irregularity in the heartbeat. Combined with this, the stethoscope can reveal fluid in the lungs which sounds like 'crackling' (Hu et al, 2014). An elevated pulse rate and rapid breathing can also be a characteristic sign, although in terms of differential diagnosis, patients can also be bradycardic. By examining the abdomen, the examiner can ascertain whether there is enlargement of the liver and by examining the lower limbs the quality of circulatory supply to and from the feet and legs can be established. In patients where there is a lack of oxygenation to the tissues there may be cyanosis (bluish colour) of the toes and a cold, clammy feel to the skin of the feet (Moccetti, Kaufmann and Tobler, 2014). Oedema may also be apparent, which is typically effects the extremities but also which may manifest in abdominal distension (Shoaib et al, 2019).

Diagnostic Imaging Tests:

Alongside clinical physical examinations, X-Raying the chest can reveal enlargement of the heart in the thoracic (chest) cavity and confirm whether there is fluid on the lungs (Yamashina, 2013). It is unlikely that heart failure patients will have a normal Electrocardiogram (ECG) reading and all abnormalities ought to be accounted for, for example ECG can be used to establish whether heart enlargement is in specific areas of the heart such as the ventricles, atria or the wall of the heart, where there could potentially be blocked arteries. In itself ECG is a useful diagnostic indicator of heart pathology but does not serve in the definitive diagnosis of the condition, since this is better supported by far better diagnostic instrumentation. Valvular damage or disease can also be seen on ECG (Yancy and McMurray, 2013). ECHO is now the gold standard for diagnosis of heart failure in terms of providing differential diagnostic indication of pathology. ECHO permits delineation between heart failure and the many other conditions which can present with similar symptoms of heart failure and assessment of the heart's anatomical structure is crucial in being able to determine optimal treatment interventions. The use of NT pro BNP as part of the diagnostic pathway for heart failure is particularly helpful to rule out heart failure if below 400ng/ml, meaning an ECHO is

then not needed. An ECG is helpful as it usually not normal in HF but the first step in diagnosing HF if the patient has symptoms is the NT pro BNP.

The volume of circulating blood is best established via echocardiogram. This is a means of establishing how much blood is in each ventricle of the heart and how much is being pumped around the body with each successive heartbeat (the medical term for this is the ejection fraction). Ejection fraction is an overall measurement of the percentage of blood leaving the filled ventricle of the left side of the heart with each contraction. The ejection fractions considered normal are 55% or higher whereas a reduced status is present at 50% or lower. Between levels of 50-55% is deemed to be borderline and a reason for continued monitoring and intervention where appropriate.

Sometimes where very specific information is needed about this a radioactive dye is injected so that the blood is clearly visible on diagnostic imaging as it travels through the heart (Rischpler, Nekolla and Schwaiger, 2013).

□ **Cardiac Catheterisation:**

This is where a small tube called a catheter is very gently pushed into a blood vessel in the heart. It measures pressure levels in the heart and also the volume of the blood being circulated via the pump mechanism of the heart. Its use provides a valuable insight into the health of the valves, the coronary arteries, and the musculature of the heart as well as the blood vessels (Barnett et al, 2013).

□ **B-type Natriuretic Peptide (BNP) Haematological Screening**

In instances of heart failure the cardiac tissue produces two proteins called B-type natriuretic peptide (BNP) and N-terminal-pro-BNP (NT-pro-BNP). Both increase in relation to the degree of heart failure present and subsequently decline with improvement. BNP screening enables heart failure to be detected in 80% of all cases (York et al, 2018).

Management of Heart Failure

The main treatments of heart failure involve significant lifestyle changes and the regular intake of prescribed medication. Across the UK there are now many cardiac rehabilitation centres, with which patients can engage. Overall address of change focuses on several areas

1. Pharmacological (Drug) Management

It is not the purpose or scope of this article to list specific pharmacological interventions for heart disease and these are widely accessible in the established literature, being updated on an ongoing basis in response to new evidence based approaches (Rossignol et al, 2019). The impact of a diagnosis of heart failure can be life changing for patients and their families and carers. The role of prescribing healthcare professionals in the multi-disciplinary care of these people is invaluable. In situations where formal clinical diagnosis has not yet happened, the reassurance and support of someone who cares cannot be underestimated. In order for this to happen effectively it is useful

for prescribing healthcare professionals to have a broad underpinning knowledge of what exactly heart failure is so that they can anticipate where a patient might need help. The management of co-morbidity plays a pivotal role in the management of heart failure and its potential complications (Anker et al, 2018).

2. Lifestyle Changes

Maintaining a healthy body mass index and reducing dietary salt intake is a key factor in heart health. This is one mechanism of reducing swelling in the feet, legs and abdomen (Abraham and Merrill, 2013). The introduction of exercise must be carefully monitored by medical professionals, particularly for those who have done no exercise at all before. Walking might be an initial appropriate starting point for some people, who might then progress to low impact aerobic exercise and swimming after a few weeks (Normandin et al, 2013). Smoking cessation is essential in improving circulatory supply and eliminating toxins from the body. Alcohol consumption should be reduced or stopped altogether and using harmful drugs must be eliminated altogether if a healthy lifestyle is to be established (Maeda et al, 2013).

3. Emotional Support for Nursing and Residential Care Residents with Heart Failure

A diagnosis of heart failure is often accompanied by increased levels of anxiety and depression is commonplace. For this reason being supportive and caring to the families of patients is similarly invaluable. It is important to remember that the scope of practice of a nurse or allied healthcare practitioner is not to provide information regarding medical diagnoses but to support those responsible in healthcare practice for bringing potentially devastating news to families in acutely distressing situations in instances of acute illness and death. Reflecting on how best to deal with this can be a useful exercise in contemplating those be human experiences in life that can only best be dealt with through a caring and compassionate approach. This might involve contemplating how effective communication skills are, how reassurance and support are best expressed and how to recognise that just being there to support patients and their families and carers yet saying nothing is just as appropriate. There are several key pharmacological interventions in heart failure that patients might have to take on a daily basis for the rest of their lives. The prescription of these drugs will be carefully monitored and sometimes adjusted so that the patient can have as high a quality life as they possibly can whilst living with heart failure (Liu et al, 2013). Nurses and allied healthcare practitioners are also ideally situated to encourage patients to take their medication regularly and not to alter dosages without consulting with their GP first. This can be lifesaving advice, especially for patients who might not necessarily understand the importance of this medication in maintaining their health and wellbeing and in preserving the remaining functionality of their heart (Boyde and Peters, 2014). These medicines might be prescribed individually or in combination with others to maximise the functional capacity of the heart

4. Palliative Care in End Stage Heart Failure

Unfortunately not all heart failure patients are appropriate candidates for treatment as their heart is damaged by disease to the extent that intervention makes no difference to the functioning capacity of the heart. This is termed end stage heart failure, where the only option is heart transplantation. In the vast majority of patients, eligibility for heart transplant surgery eliminates this as a means of intervention. The prognosis for this stage of the condition is poor and palliative care is the only pathway left for the patient, where only 50% of patients live for up to five years, with the prognosis better for women than men (Boilson et al, 2010). Patients diagnosed with end stage heart failure have care needs in relation to their poor overall quality of life, the extent of their need for symptom management and their often complex social needs. This can place a great strain on patients and their families and carers. Palliative care was defined by the World Health Organisation as an approach to improving the quality of life of patients and their families facing the problem associated with life threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems associated with physical, psychosocial and spiritual discomfort or need. Palliative care is a means of providing relief from pain and other distressing symptoms whilst at the same time neither quickening nor delaying death. Patients are supported as best as possible to cope with their illness and maintain as active as possible until the end. Optimal palliative care provision also provides an invaluable source of support for families and carers both during the final stages of illness and in the process of bereavement beyond patient death. Both the NICE Guidelines and the European Society of Cardiology have provided a valuable set of information for the optimal palliative care of patients with end stage heart failure (Real, Cowles and Wierzbicki, 2018; *EHJ* (2016)).

There is also the need for compassionate decision making around the potential of deactivating implantable cardioverter defibrillators (ICDs) in those patients with heart failure who are nearing the end of their lives (Javaid, Squirrell and Farooqi, 2018). This decision making ought to ideally take place with the patient and undertaken via the cardiologist and the heart failure specialist nurse or physiologist. Often it coincides with when patients are in a position where their health is worsening or when transfer home or to a hospice is being organised. This may be for palliative care. Deactivating ICDs is a decision taken to ensure that the patient is not subject to unnecessary 'shock' as the body's physiological response to processes of dying become evident (Pitcher et al, 2016). It may be considered when an active Do Not Attempt Cardiopulmonary Resuscitation (DNACPR) is in place. Whilst turning off the ICD does not cause death it does have the functional capacity to provide slow heart rhythm support if the patient's health has deteriorated to such an extent that they require it (Tran et al, 2019). In instances where emergency temporary

deactivation is not undertaken, and it is not possible for a cardiac physiologist to be present and the patient is expected to die imminently, then a magnet can be placed on the patient's skin directly above the bump of the ICD and taped in place. This ought to be retained in position following death and will be indicated on the death certificate.

Preventing Heart Failure and Advocating a Healthy Lifestyle

Prescribing healthcare professionals can play a pivotal role in the prevention of heart failure by advocating a healthy lifestyle that incorporates a healthy balanced diet and regular exercise as part of everyday life (Endres et al, 2011). It is important to acknowledge that in many people heart failure cannot be avoided since they live with ongoing risk factors such as hypertension, hypercholesterolaemia and they need ongoing pharmacological intervention to ensure that these factors are controlled as far as possible so that the likelihood of heart failure can be significantly reduced (Khawaja et al, 2012).

Conclusion

The high prevalence rates of heart failure in the context of nursing and residential care, necessitate acknowledgement of specific address in relation to improving both quality of life and healthcare outcomes for older adults. Increasing the underpinning knowledge of the condition for healthcare workers caring for older people is therefore an imperative means of addressing those still undiagnosed with the condition or whose present lifestyles may predispose them to long term ill health. Referral for ECG as a diagnostic test for those whose symptomology may be suggestive of heart failure is pivotal to their timely diagnosis and management. What is apparent is that the use of NT pro BNP as part of the diagnostic pathway for heart failure is particularly helpful to rule out heart failure if below 400ng/ml, meaning an ECHO is then not needed. An ECG is helpful as it usually not normal in HF but the first step in diagnosing HF if the patient has symptoms is the NT pro BNP.

As always, people living with heart failure ought to be treated compassionately and provided with sufficient support and daily choice that they can be empowered to adopt healthy lifestyles and avoid a sedentary lifestyle. The role of nursing and residential care staff in supporting these patients and their families and carers is invaluable in ensuring they can maximise their potential to have a long and healthy life.

References

Abraham, J., & Merrill, A. (2013). Effectiveness of a Sodium Restricted Diet on Reducing Weight Gain and Edema Formation in Adult Patients with Chronic Heart Failure: A Systematic Review Protocol. *The JBI Database of Systematic Reviews and Implementation Reports*, 11(4), 187-196.

Aghababian, R. V. (2019). Acutely decompensated heart failure: opportunities to improve care and outcomes in the emergency department. *Reviews in Cardiovascular Medicine*, 3(S4), 3-9.

An, Y., Iguchi, M., Aono, Y., Ikeda, S., Doi, K., Ishii, M., ... & Hasegawa, K. (2018). P6591 Prognostic impact of paroxysmal versus sustained atrial fibrillation on the incidence of cardiac death and heart failure hospitalization: The Fushimi AF Registry. *European Heart Journal*, 39(suppl_1), ehy566-P6591.

Anker, M. S., von Haehling, S., Landmesser, U., Coats, A. J., & Anker, S. D. (2018). Cancer and heart failure more than meets the eye: common risk factors and co-morbidities. *Eur J Heart Fail*, 20, 1382-1384.

Arden, C., Chambers, J. B., Sandoe, J., Ray, S., Prendergast, B., Taggart, D., & Otto, C. M. (2014). Can we improve the detection of heart valve disease?. *Heart*, 100(4), 271-273.

Aronow, W. S., Banach, M., & Ahmed, A. (2014). Hypertension and prevention of diastolic heart failure in the aging population. In *Aging and Heart Failure* (pp. 35-45). Springer New York.

Azad, N., & Lemay, G. (2014). Management of chronic heart failure in the older population. *Journal of geriatric cardiology : JGC*, 11(4), 329–337. doi:10.11909/j.issn.1671-5411.2014.04.008

Barnett, C. F., Vaduganathan, M., Lan, G., Butler, J., & Gheorghiade, M. (2013). Critical reappraisal of pulmonary artery catheterization and invasive hemodynamic assessment in acute heart failure. *Expert review of cardiovascular therapy*, 11(4), 417-424.

Boilson, B. A., Raichlin, E., Park, S. J., & Kushwaha, S. S. (2010). Device therapy and cardiac transplantation for end-stage heart failure. *Current problems in cardiology*, 35(1), 8-64.

Boyde, M., & Peters, R. (2014). Education Material for Heart Failure Patients: What Works and What Does Not?. *Current heart failure reports*, 1-7.

Braunwald, E. (2013). Cardiovascular science: opportunities for translating research into improved care. *The Journal of clinical investigation*, 123(1), 6-10.

Conrad, N., Judge, A., Tran, J., Mohseni, H., Hedgecott, D., Crespillo, A. P., ... & Rahimi, K. (2018). Temporal trends and patterns in heart failure incidence: a population-based study of 4 million individuals. *The Lancet*, 391(10120), 572-580.

Damman, K., Valente, M. A., Voors, A. A., O'Connor, C. M., van Veldhuisen, D. J., & Hillege, H. L. (2014). Renal impairment, worsening renal function, and outcome in patients with heart failure: an updated metaanalysis. *European heart journal*, 35(7), 455-469.

Dickinson, O., Chen, L. Y., & Francis, G. S. (2014). Atrial fibrillation and heart failure: intersecting populations, morbidities, and mortality. *Heart failure reviews*, 19(3), 285-293.

Eaton, G., Williams, V., Wong, G., Roberts, N., & Mahtani, K. R. (2019). Protocol for the impact of paramedics in NHS primary care: application of realist approaches to improve understanding and support intelligent policy and future workforce planning. *British Paramedic Journal*, 4(3), 35-42.

EHJ (2016) 37 (27):2129-2200 - <https://doi.org/10.1093/eurheartj/ehw128>

Endres, M., Heuschmann, P. U., Laufs, U., & Hakim, A. M. (2011). Primary prevention of stroke: blood pressure, lipids, and heart failure. *European heart journal*, 32(5), 545-552.

Garfield, L. D., Scherrer, J. F., Hauptman, P. J., Freedland, K. E., Chrusciel, T., Balasubramanian, S., ... & Lustman, P. J. (2014). Association of anxiety disorders and depression with incident heart failure. *Psychosomatic medicine*, 76(2), 128-136.

Ginde, S., & Earing, M. G. (2018). When the heart is not to blame: managing lung disease in adult congenital heart disease. *Progress in cardiovascular diseases*, 61(3-4), 314-319.

Hobbs, F. D. R. (2002). Unmet need for diagnosis of heart failure: the view from primary care. *Heart*, 88(suppl

Hu, Y., Bian, S., Filoche, M., Grotberg, J. C., White, J., Takayama, S., & Grotberg, J. B. (2014). Flow and Sound Generation in Human Lungs: Models of Wheezes and Crackles. In *Fluid-Structure-Sound Interactions and Control* (pp. 301-317). Springer Berlin Heidelberg.

Javaid, M. R., Squirrell, S., & Farooqi, F. (2018). Improving rates of implantable cardioverter defibrillator deactivation in end-of-life care. *BMJ open quality*, 7(2), e000254.

Juillière, Y., Jourdain, P., Suty-Selton, C., Béard, T., Berder, V., Maître, B., ... & Danchin, N. (2013). Therapeutic patient education and all-cause mortality in patients with chronic heart failure: a propensity analysis. *International journal of cardiology*, 168(1), 388-395.

Khawaja, O., Kotler, G., Gaziano, J. M., & Djoussé, L. (2012). Usefulness of desirable lifestyle factors to attenuate the risk of heart failure among offspring whose parents had myocardial infarction before age 55 years. *The American journal of cardiology*, 110(3), 326-330.

Linden, B. (2019). Chronic heart failure in adults: NICE National Guideline and Quality Standard. *British Journal of Cardiac Nursing*, 14(12), 1-5.

Liu, S. S., Monti, J., Kargbo, H. M., Athar, M. W., & Parakh, K. (2013). Frontiers of therapy for patients with heart failure. *The American journal of medicine*, 126(1), 6-12.

Maeda, U., Shen, B. J., Schwarz, E. R., Farrell, K. A., & Mallon, S. (2013). Self-efficacy mediates the associations of social support and depression with treatment adherence in heart failure patients. *International journal of behavioral medicine*, 20(1), 88-96.

Mahmood, S. S., Levy, D., Vasan, R. S., & Wang, T. J. (2014). The Framingham Heart Study and the epidemiology of cardiovascular disease: a historical perspective. *The Lancet*, 383(9921), 999-1008.

Malik, F. A., Gysels, M., & Higginson, I. J. (2013). Living with breathlessness: A survey of caregivers of breathless patients with lung cancer or heart failure. *Palliative medicine*, 27(7), 647-656.

Mandal, A. K. (2014). Pathophysiology, Prevention and Treatment of Progressive Renal Failure Associated with Severe Congestive Heart Failure. *Textbook of Nephrology*, 169.

Matthay, M. A. (2014). Resolution of Pulmonary Edema. Thirty Years of Progress. *American journal of respiratory and critical care medicine*, 189(11), 1301-1308.

Mejía, A., Richardson, G., Pattenden, J., Cockayne, S., & Lewin, R. (2014). Cost-effectiveness of a nurse facilitated, cognitive behavioural self-management programme compared with usual care using CBT manual alone for patients with heart failure. *International journal of nursing studies*.

Mocchetti, F., Kaufmann, B. A., & Tobler, D. (2014). Differential clubbing and cyanosis: a pathognomonic finding in cardiology. *European heart journal*, 35(21), 1410-1410.

Muhlestein, J. B., Lappé, D. L., Lima, J. A., Rosen, B. D., May, H. T., Knight, S., ... & Anderson, J. L. (2014). Effect of screening for coronary artery disease using CT angiography on mortality and cardiac events in high-risk patients with diabetes: the FACTOR-64 randomized clinical trial. *JAMA*, 312(21), 2234-2243.

Normandin, E., Nigam, A., Meyer, P., Juneau, M., Guiraud, T., Bosquet, L., ... & Gayda, M. (2013). Acute responses to intermittent and continuous exercise in heart failure patients. *Canadian Journal of Cardiology*, 29(4), 466-471.

Oluleye, O., Duval, S., & Jain, R. (2014). Sex differences in heart failure hospitalizations in patients with hypertrophic cardiomyopathy. *Journal of the American College of Cardiology*, 63(12_S).

Pitcher, D., Soar, J., Hogg, K., Linker, N., Chapman, S., Beattie, J. M., ... & Patterson, G. (2016). Cardiovascular implanted electronic devices in people towards the end of life, during cardiopulmonary resuscitation and after death: guidance from the Resuscitation Council (UK), British Cardiovascular Society and National Council for Palliative Care. *Heart*, 102(Suppl 7), A1-A17.

Pradhan, A. D., Givertz, M. M., & Baughman, K. L. (2013). Heart Failure and Obesity: The Risk of Development and the Treatment of Heart Failure in Obese Patients. *Obesity and Cardiovascular Disease*, 403.

Real, J., Cowles, E., & Wierzbicki, A. S. (2018). Chronic heart failure in adults: summary of updated NICE guidance. *Bmj*, 362, k3646.

Rossignol, P., Hernandez, A. F., Solomon, S. D., & Zannad, F. (2019). Heart failure drug treatment. *The Lancet*, 393(10175), 1034-1044.

Sampson, M. (2019). Antiarrhythmic drugs. Part 3: rate-control drugs. *British Journal of Cardiac Nursing*, 14(11), 1-11.

Shah, K., Parekh, N., Clopton, P., Anand, I., Christenson, R., Daniels, L., ... & Maisel, A. (2013). Improved survival in patients with diastolic heart failure discharged on beta-blocker and ace inhibitors. *Journal of the American College of Cardiology*, 61(10S).

Shoaib, A., Mamas, M. A., Ahmad, Q. S., McDonagh, T. M., Hardman, S. M., Rashid, M., ... & Dargie, H. J. (2019). Characteristics and outcome of acute heart failure patients according to the severity of peripheral oedema. *International journal of cardiology*, 285, 40-46.

Tousoulis, D., Oikonomou, E., Siasos, G., & Stefanadis, C. (2014). Statins in heart failure—With preserved and reduced ejection fraction. An update. *Pharmacology & therapeutics*, 141(1), 79-91.

Tran, P., McDonald, M., Kunaselan, L., Umar, F., & Banerjee, P. (2019). A hundred heart failure deaths: lessons learnt from the Dr Foster heart failure hospital mortality alert. *Open heart*, 6(1), e000970.

Tresch, D. D. (2000). Clinical manifestations, diagnostic assessment, and etiology of heart failure in elderly patients. *Clinics in geriatric medicine*, 16(3), 445-456.

Valentova, M., & von Haehling, S. (2014). An overview of recent developments in the treatment of heart failure: update from the ESC Congress 2013. *Expert opinion on investigational drugs*, 23(4), 573-578.

van Deursen, V. M., Damman, K., van der Meer, P., Wijkstra, P. J., Luijckx, G. J., van Beek, A., ... & Voors, A. A. (2014). Co-morbidities in heart failure. *Heart failure reviews*, 19(2), 163-172.

Vanderlaan, R. D., Caldarone, C. A., & Backx, P. H. (2014). Heart failure in congenital heart disease: the role of genes and hemodynamics. *Pflügers Archiv-European Journal of Physiology*, 466(6), 1025-1035.


Waldrop, A. E., & Cohen, B. E. (2014). Trauma Exposure Predicts Alcohol, Nicotine, and Drug Problems Beyond the Contribution of PTSD and Depression in Patients with Cardiovascular Disease: Data from the Heart and Soul Study. *The American Journal on Addictions*, 23(1), 53-61.

Westaby, S. (2014). Evidence-based surgery for chronic heart failure. *Medicine*, 42(10), 574-578.


Yancy, C. W., & McMurray, J. J. (2013). ECG—Still the Best for Selecting Patients for CRT. *New England Journal of Medicine*, 369(15), 1463-1464.

York, M. K., Gupta, D. K., Reynolds, C. F., Farber-Eger, E., Wells, Q. S., Bachmann, K. N., ... & Wang, T. J. (2018). B-type natriuretic peptide levels and mortality in patients with and without heart failure. *Journal of the American College of Cardiology*, 71(19), 2079-2088.


Nursing and Residential Care
FINAL AMENDMENTS FEEDBACK AND COMMENTARY
JANUARY 14th 2020

 **Reviewer Comment:** There needs to be greater clarity throughout regarding the use of NT pro BNP as part of the diagnostic pathway for heart failure - particularly helpful to rule out heart failure if below 400ng/ml meaning an echo is then not needed. This needs referring to in the Conclusion and also on page 6 where the section on NT pro BNP needs including in the diagnosis section earlier on the page. An ECG is helpful as it usually not normal in HF but the first step in diagnosing HF if the pt has symptoms is the NT pro BNP.


Author Response: Many thanks, we have now integrated a degree of greater clarity throughout the article regarding the use of NT pro BNP as part of the diagnostic pathway for heart failure - particularly helpful to rule out heart failure if below 400ng/ml meaning an echo is then not needed. As recommended we have addressed and referred to this specifically on page 6 and in the conclusion. We have also ensured that the section on NT pro BNP has been included in the diagnosis section earlier on page 6 than we had originally included. We have also incorporated a section to reflect the use of ECGs where appropriate.

 **Reviewer Comment:** The mention of 8 key pharmacological interventions on page 8 needs removing. There are a number of key pharmacological interventions - but not 8.


Author Response: Many thanks for pointing this out, we have now corrected this!

 **Reviewer Comment:** Page 4 - it is not correct to have a sub title left sided HF (HFrEF) as this is not correct. It is fine to have the title HFrEF and then the paragraph makes sense.

Author Response: Many thanks again, we have now corrected this.

 **Reviewer Comment:** The next paragraph should be HFpEF (not right sided HF). This terms included right sided HF but also diastolic HF which needs mentioning.

Author Response: Many thanks, we have corrected this and also incorporated diastolic HF into this paragraph.

 **Reviewer Comment:** The ESC guidelines for hypertension have been referenced not the ESC HF guidelines.

Author Response: Many thanks for spotting this – this has now been amended fully.



Reviewer Comment: The definition of HF on page 2 needs referencing. I would suggest using a definition from NICE or ESC

Author Response: Many thanks, we have now cited and referenced this operational definition, as recommended.

We are sincerely grateful for all of the commentary and supportive feedback we have had in relation to this article – many thanks to the reviewers.