Practical issues in improving medical management of heart failure in the elderly

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Heart failure is a complex syndrome in which a primary disturbance of cardiac contraction leads to retention of sodium and water by the kidney and activation of compensatory mechanisms such as the sympathetic nervous and renin–angiotensin–aldosterone systems in an attempt to preserve cardiac output. It is associated with reduced exercise tolerance, impaired quality of life and 5-year mortality in excess of 50%, the prognosis being worse than many cancers (Bui et al, 2011).

With each additional decade of life there is an approximate doubling of the rate and incidence of heart failure. The prevalence rises from 2–3% in the under-65s to 10–20% in the over-70s (Dickstein et al, 2008). Heart failure accounts for a large number of hospital admissions with major financial implications on the health care system. Despite major advances in management resulting in more patients surviving after myocardial infarction, heart failure remains the only major cardiovascular disease with increasing incidence and prevalence (Mair et al, 1997). For the purpose of this article we will define the elderly population as those over the age of 80 years.

Diagnosis and treatment

The diagnosis and treatment for heart failure usually follows the same pathway as in the younger patient. The clinical history and examination must be combined with an electrocardiogram (ECG), chest X-ray and a B-type natriuretic peptide (BNP) assay where available and referral for an echocardiogram where appropriate (Swedberg et al, 2005; Dickstein et al, 2008). It is generally accepted that the combination of a negative ECG and BNP excludes the diagnosis of heart failure. Recent guidelines suggest that an echocardiogram should be mandatory in all suspected cases of heart failure; this will not only confirm diagnosis but help determine the cause of this condition.

The pharmacological treatment of heart failure in the elderly population is the same as that in a younger patient. The use of diuretics, angiotensin-converting enzyme (ACE) inhibitors and beta-blockers remain a first-line therapeutic approach, in addition to aldosterone antagonists (spironolactone or eplenerone) and digoxin.

Diuretics provide relief from symptoms and signs of pulmonary and venous congestion by promotion of fluid loss through the kidneys.

The renin-angiotensin-aldosterone system attempts to preserve cardiac output and peripheral perfusion by vasoconstriction and sodium and water retention. Although beneficial in the short term it increases the workload on the failing heart and can worsen symptoms. Inhibition of this compensatory mechanism with ACE inhibitors, angiotensin receptor blockers or aldosterone antagonists reduces vasoconstriction and promotes the loss of sodium and water via the kidneys.

Activation of the sympathetic nervous system mechanisms increases heart rate, contractility and vasoconstriction. In heart failure, this results in signs of hypotension, tachycardia and fluid overload. Beta-blockers are used to inhibt the sympathetic system with the aim of improving ventricular function and patient wellbeing.

The following sections will address some of the challenges encountered in the medical management of heart failure in the elderly population. Important side effects of specific treatments will also be highlighted.

Basic principles of pharmacological measures

When treating older patients with heart failure, we have to consider the heterogeneity of the older population, and

ABSTRACT

Heart failure is a complex syndrome with an increasing prevalence in the elderly. The presence of multiple comorbidities and associated frailty make management of an already complex disease process more challenging. A practical and pragmatic approach is presented in this paper with regards to pharmacological interventions, the role of heart failure specialist nurses in the context of the multidisciplinary team (MDT) and end-of-life care issues.

KEY WORDS

- Chronic heart failure
- Elderly
- Specialist nurses
- Palliative care

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the impact of polypharmacy, comorbidities, and social circumstances in individual patients. Treatment goals should be individualized; however, studies suggest that evidence-based heart failure treatment is underused in the elderly population (Lee et al, 2005). This is due to the elderly population being under-represented in clinical trials, thus there are no specific guidelines targeting this population at present. The overall objective of treatment should be improved symptoms and better quality of life with prolongation of survival where possible, and all goals should be discussed and agreed by the patient and his/her carers.

The pharmacokinetics and pharmacodynamics of medications are altered in the elderly patient, which increases the incidence of side effects. There is an increased prevalence of renal dysfunction, which will alter the secretion of water-soluble drugs and hence increase the risk of toxicity. Further, the reduction in total body volume as we age will increase the half-life of many drugs. The change in enzyme activity and reduced liver volume will aid the accumulation of lipid-soluble drugs (McLean and Couteur, 2004) All of these biological changes of ageing will affect the metabolism of drugs in the elderly patient and hence affect tolerability and effect. Thus it is not uncommon for elderly patients to be on a lower dose of heart failure treatments than the maximum suggested dose.

Considerations with use of diuretics

The use of diuretics in heart failure is standard practice. However, in the elderly their use may be associated with some inherent complications. The quality of life can be severely affected by the diuresis especially if a patient's mobility is already impaired. Patients do not like to go out unless they know where the toilets are and sometimes will not take their diuretics if they know they have a day out planned. Patients are sometimes too embarrassed to admit to poor tolerability of drugs, with resultant poor compliance with medications. It is important to inform patients that they must not miss their dose of diuretic. Strategies can be put in place to accommodate their lifestyle and improve compliance. They can take their diuretic in the evenings if they are regularly outdoors during the day and they can reduce their fluid intake on days when they will be away from home. However, the latter option must be supervised by a health professional in order to avoid dehydration. Health professionals should be aware of these issues, and should be pro-active in addressing them.

Considerations with use of ACE inhibitors

Cough is an important side effect to remember when using ACE inhibitors. This side effect is not exclusive to elderly patients, but it may prove more troublesome for this population. In patients with multiple comorbidities it is prudent to take a good history as there may be other reasons for this non-specific symptom.

Another important side effect of ACE inhibitors is symptomatic hypotension, and this can manifest as unexplained falls or syncope. This can be reduced with simple measures such as taking the ACE inhibitors at night and carefully determining the maximum tolerated dose. Some ACE inhibitors can be given as a split dose, which can also reduce the risk of hypotension.

It is very important to inform patients of these side effects when starting them on ACE inhibitors. Although the dose of ACE inhibitors should be titrated as in younger patients, it must be remembered that the maximum dose may not be achieved due to the higher incidence of side effects in older people.

Considerations with use of spironolactone

The most common side effect of this drug is hyperkalaemia and worsening renal function and therefore the patient should be monitored closely with blood tests, especially when this drug is initiated. As the rates of prescription of aldosterone antagonists rise, so does the incidence of hyperkalaemia; studies suggest a 3 to 5-fold increase, over a 5-year period, in the number of associated hospital admissions (Juurlink et al, 2004). Hyperkalaemia is more of a problem in the elderly, due to polypharmacy and the increased incidence of chronic kidney disease (Wozakowska-Kaplan and Janowska-Molenda, 2009; Kandula and Shah, 2009). The risk of hyperkalaemia increases in special circumstances such as dehydration, diarrhoea, and intercurrent illnesses. In these circumstances, the patient should be told to stop spironolactone and seek medical advice early (Dinsdale et al, 2005). Recent studies also suggest that co-prescription with either nitrofurantoin or trimethoprim-sulfamethoxazole, both common antibiotics used in the elderly for treatment of urinary tract infections, leads to an increase in the risk of hospitalization for hyperkalaemia (Antoniou et al, 2011). Dietary advice on excess consumption of potassium-rich foods—e.g. bananas, wheat bran or dark chocolate—is also advised.

The interaction of spironolactone with digoxin is one not to forget. Spironolactone can not only interfere with some digoxin assays but can also result in digoxin toxicity by increasing its half-life. Thus it is advisable to monitor for signs of digoxin toxicity in patients on both drugs and reduce the dose of digoxin accordingly (Dec, 2003).

We must not forget other important side effects such as gynaecomastia. This can be very distressing for the patient, but reassuringly can be reversed on drug cessation (Haynes and Mookadam, 2009). Eplenerone, a derivative of spironolactone, can be used in these cases as it does not interact with testosterone or progesterone receptors (Brown, 2003). The rate of gynaecomastia with eplenerone is similar to that of placebo. However, the risk of hyperkalaemia remains (Zannad et al, 2011). Such side effects make spironolactone a challenging treatment to instigate in the elderly. With the correct education and specialist support it remains an effective therapy.

Considerations with use of beta-blockers

The SENIORS trial suggests that beta-blockers reduce mortality and hospitalizations in the elderly (Flather et al, 2005; Del Sindaco et al, 2010). One review suggests that the out-

comes for older patients on beta-blockers are similar to that of younger patients (Waller and Waller, 2011). Studies also suggest that beta-blockers are better tolerated than previously thought. A recent Cochrane review suggests that cardioselective beta-blockers can be initiated in patients with mild to moderate airways disease, with careful monitoring of their symptoms and peak expiratory flow rate (PEFR) (Salpeter et al, 2002; Salpeter et al, 2005). In terms of bradyarrhythmias, beta-blockers should only be avoided if the patient is symptomatic or there is evidence of second or third-degree heart block (Yanagisawa et al 2010, Waller and Waller, 2011) It is advisable for patients to check their pulse and contact a health professional if it is below 50 beats per minute. The risk of initial weight gain on starting beta-blockers remains and elderly patients may not reach the maximum suggested dose.

Considerations with use of digoxin

Digoxin has been shown to reduce hospital admission for heart failure by 28% in patients in sinus rhythm within three years of starting therapy (The Digitalis Investigation Group, 1997). This effect is achieved by slowing the heart rate and strengthening contractility resulting in improved ventricular filling and an increase in cardiac output. Thus it is a reasonable therapy to instigate even though studies fail to show any mortality benefit, as it may improve quality of life. Further, it has been shown to improve symptoms, namely dyspnoea, in those patients with moderate to severe heart failure who are in sinus rhythm (Jaeschke at al, 1990). Currently some clinicians still use digoxin for rate control of atrial fibrillation in selected patients who cannot tolerate beta-blockers.

The possibility of digoxin toxicity in older patients with low potassium levels should always be remembered. They may already be at risk of hypokalaemia due to low body mass and impaired renal function and so careful renal monitoring is needed. Patients should be informed of this potentially serious side effect, and clinicians should be vigilant and cautious when prescribing digoxin to patients on other medications that can lower potassium levels in the blood, such as thiazide diuretics.

Compliance with medication

Studies suggest that poor compliance with medications is the trigger for decompensation of heart failure in up to 60% of hospitalized patients (Van der Wal et al, 2004). In the elderly population, it is prudent to remember that the issue of compliance is complex and requires a multifactorial approach (Boparai and Korc-Grodzicki, 2011). Non-compliance is common in patients with heart failure (Ghali et al, 1988). The following list highlights some important aetiologies:

- Visual impairment: patients may not be able to actually see the tablets or instructions (Botelho and Dudrak, 1992)
- Poor mobility: patients may not be able to collect their repeat prescription
- Reduced dexterity due to arthritis/ cerebrovascular disease: patients may not be able to actually pick the tablets up or take them out of the packet due to impaired fine finger movement (Hope et al, 2004)
- Low mood: patients may be too depressed and ignore taking their medications (Saveanu and Mayes, 2011)
- Cognitive impairment: patients may not understand or remember their treatment regime, or they may take an unintentional overdose due to short term memory loss (Arlt et al, 2008)
- Polypharmacy: simplifying the drug regime by reducing

the number of drugs and frequency of doses can improve compliance.

Various compliance aids are available to help try and overcome some of the above challenges. Organizer boxes have been shown to aid compliance, especially in the elderly (Rivers, 1992). A recent UK-based study suggested that although multicompartment aids were useful in aiding compliance in elderly patients who are either cognitively impaired or dependent for their activities of daily living, they led to delayed discharges from hospital. However, cognitively intact patients felt it took away their autonomy (Brown et al, 2010). In these cases, a medication administration records sheet (MARS) may be helpful.

'Reminder packaging' may improve compliance with long-term medications (Mahtani et al, 2011). The date and time that the medication should be taken is written on the packet, but this relies on intact vision. Monitored dosage systems (also known as blister packs) are pre-filled by a pharmacist and contain a sheet outlining the drug regime. This is a good way of monitoring compliance without completely removing the patient's autonomy. Alarms preset to remind patients when doses are due can also be helpful (Cramer, 1998).

Such devices act as daily dose reminders, but these also have disadvantages. Large tablets, sublingual and effervescent preparations may have to be stored separately, which removes the benefits of such compliance aids if the patient is self-medicating (Corlett, 1996). This can be particularly problematic for drugs with variable dosing such as warfarin. In such cases, a medication review is suggested to ensure that such prescribed medication is still appropriate if the patient is now requiring a compliance aid. As previously mentioned, side effects of medications will also reduce compliance, thus patient education is vital.

Non-pharmacological treatment

Compliance is not only an issue affecting medication. Lifestyle changes may be more difficult to undertake in the elderly population. Patients may find it difficult to restrict their salt intake and change their lifelong dietary habits. By providing them with helpful alternatives they may be more amenable to change. Dieticians are also helpful in offering patient education and appropriate dietary alternatives and supplements. If patients have meals on wheels it is prudent to inform them that they would require low salt options. Some elderly people rely on pre-packed meals; again it is prudent to educate them on appropriate choices that are available. Salt restriction needs to be balanced with the potential risk of malnutrition if their food choices are so unpalatable that they stop eating. One group has recently suggested reducing salt intake to <5 g/day (maximum recommended adult intake) (Feng et al, 2011). However, the evidence base is conflicting and as yet no general consensus has been reached (Lainscak et al, 2011). Thus we suggest salt restriction to be advised on a case-by-case basis

With regards to fluid intake, many elderly people drink less than 2 litres a day, so further fluid restrictions may not be needed. However, it is necessary to ask specifically about alcohol intake as some patients do not mention this in their daily fluid intake. It is important to highlight not only the effects of alcohol on fluid balance but also its direct effects on the myocardium. It would be of value to emphasize that fluids can come in various forms in the diet and so these options may also need to be restricted e.g. soup, or milk on cereal.

Patients should be immunized with the annual flu jab and also be vaccinated against pneumococcus (National Clinical Guideline Centre for Acute and Chronic Conditions, 2010).

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In the elderly population, it is important to remember that the issue of compliance is complex, with many factors at work

The role of the primary care and multidisciplinary team

The majority of patients with heart failure are seen in primary care (Yu et al, 2006). The patient journey must be supported by a multi-disciplinary team (MDT) if all patient needs are to be met. Systematic reviews have shown that MDT input for patients with heart failure reduce morbidity and all-cause mortality, especially if this service is continued in the community (McAlister et al, 2004). This has also been shown to be true when specifically applied to the elderly population (Ahmed, 2002).

The support network must consist of not only GPs, community matrons/district nurses, heart failure nurses and secondary care physicians, but also ongoing programmes that allow identification of the 'unpredictable' nature of the disease so that community interventions can be started early. Patient education is a must as it empowers the patient to take control of his/her illness. Such integrated systems are now more widely accepted and tend to be nurse-led. Studies suggest that such disease management programmes improve outcomes in the elderly (Del Sindaco et al, 2007).

Day hospital is another way to assess the older patient with heart failure. Not only will patients get the medical input they require, but they will also gain access to physi-

otherapy and occupational therapy services. This approach has been shown to reduce mortality and morbidity when used specifically for patients with heart failure (Capomolla et al, 2002). Home visits can identify environmental factors that may influence patient management, including those that may require support from social care.

Patients with heart failure visit their GP between 3 and 11 times a year about their condition and this is likely to increase due to our ageing population (Patel et al, 2008). The primary care team are also contractually obliged not only to confirm the diagnosis of heart failure, but also to maintain follow up in the appropriate setting due to the Quality and Outcomes Framework (QOF). However, each local area has a different way of providing such services and so the level of care varies greatly between localities. The QOF is a points-based system allowing remuneration for GPs who provide a set standard of care for specific diseases. Heart failure is one of these subsections; payment is calculated from electronic clinical codes, entered into a computer system. The QOF has incentives for both primary and secondary prevention. In addition, the National Service Framework for Coronary Heart Disease requires all primary care teams to compile a register of heart failure patients (Department of Health, 2000). By providing such a structured framework, treatment for heart failure patients can only improve.

It is also the role of the GP to decide when to refer patients to secondary care and to which specialty. This is often done in coordination with the heart failure specialist nurses. A frail elderly patient with multiple comorbidities would benefit from a geriatric outpatient setting where he/she can have a comprehensive geriatric assessment (CGA) as well as addressing his/her heart failure. CGA has been shown to be a useful tool to aid prediction of 30-day mortality in elderly patients with heart failure (Pilotto et al, 2010). In some circumstances a referral to a cardiologist may be more appropriate if there is a suggestion of underlying valvular disease. In some areas there may be GPs with a special interest in heart failure; they can often bridge the gap between the community nurses and secondary care.

The role of heart failure specialist nurses

Heart failure specialist (HFS) nurses will meet patients during their admission in hospital in order to build rapport and increase effectiveness of the community service that they provide. HFS nurses have multiple roles:

- Assessment of clinical status with managing of medication
- Education of patients, carers and relatives
- Community based monitoring of patient.

This role varies according to the policy in each health locality. However, they not only offer monitoring and alteration of medications, but are also well-placed to offer a more holistic approach to care. In addition, they are likely to have a good network in the community, making referrals to other specialties more streamlined. They are also able to prescribe certain medications providing the patient with a more proactive timely intervention.

Before the advent of the HFS nurse, continuity of care and coordination was a difficult aim to achieve (Boyd et al, 2004). The HFS nurse can play a crucial role in co-ordinating different members of the MDT and being the cornerstone for patient care continuity. A nurse-led service for older patients not only reduces the risk of hospital readmission and outpatient visits but also improves quality of life in a cost-effective manner (Rondinini et al, 2008; Kwok et al, 2008; Duffy et al, 2011). A pilot study suggested that it also significantly reduced depressive symptoms in elderly heart failure patients (Delaney and Apostolidis, 2010).

Assessing an older person in his/her own environment can provide a lot of information regarding social situation and possible reasons for poor compliance with medications. It also provides an outreach service to those who find it difficult to leave their home (Vrijland and Brienen, 2010).

The role of the palliative care team

Palliative care is an important part of the patient journey for those with end-stage heart failure. The palliative care team not only provides excellent symptom control, but also emotional, psychosocial and spiritual support for both the patient and his/her carers. It is especially useful in the older adult where multiple comorbidities and polypharmacy make end stage heart failure a complex syndrome requiring specialist care (Bekelman et al, 2008).

It is important to inform patients that they can have support at home but also be aware that they can be offered admission to a hospice or nursing home if they require more intensive care or the patient is not coping at home. These teams can aid the patient preparing for death and remove some misconceptions that the patient may have. The palliative care team can also help with advanced care planning in the community, again empowering the patient at all stages of their journey. They are best equipped to discuss with the patient some sensitive issues such as when to withdraw treatment and the patient's individual ideas regarding end-of-life care.

Studies suggest that palliative care services and support for non-cancer patients such as those with heart failure are often scarce (Gibbs et al, 2006) in the face of increasing demands. Up to 10% of the caseload of community HFS nurses will have needs that require specialist palliative care (Goodlin et al, 2004). Clinicians can be uncertain on how to approach such discussions (Barclay et al, 2011). However, more recently there has been a positive drive to change this culture. Structured initiatives such as the 'Better Together' programme funded by The British Heart Foundation and Marie Curie Cancer Care have shown excellent results (Pattenden and Mason, 2010). This was a combined initiative to assess the impact of a programme involving HFS nurses and palliative care nurses. They found that not only did more patients end their life in their preferred place, but carers felt more supported with an overall reduction in the cost of care. HFS nurses are now striving to work with pallia-

tive care in order to bridge the gap between active treatment and palliation.

The role of support groups

Education is a key factor in managing heart failure. By empowering patients, we allow them to recognize changes in symptoms that require medical attention, but also give them control of this chronic condition. Support groups have moved on from simply allowing patients to talk about their condition with others, to those that invite guest speakers to educate patients. Cardiac rehabilitation sessions and exercise classes not only provide a strong social network, but have been shown to reduce symptoms and improve quality of life, especially in the elderly population (Austin et al, 2005; Bocalini et al, 2008; Pozehl et al, 2010). However, the elderly housebound are unlikely to be able to get to such sessions, hence these patients are more than likely to benefit from community heart failure support programs the most.

A recent study has investigated various methods to provide community support for heart failure patients with the aim of reducing social isolation (Peardon et al, 2010). They found that combining current MDT teams with the voluntary sector was not only cost-effective, but was also well-received by the patients involved. Those patients in the volunteer befriending group were 100% satisfied and felt better able to manage their chronic condition. Those patients who either received a newsletter or were part of a forum felt that this new model increased inter-professional communication and empowered them to better manage their heart failure. Other forms of education such as patient leaflets and DVDs are equally effective (Veroff et al, 2011). This study showed that patient education is mandatory and that it can be delivered through innovative methods.

The British Heart Foundation (BHF) is an excellent resource not only for patients, but also for their carers, nurses and clinicians alike. Its website provides a wide variety of information from how to practically cope with heart failure to how to get in touch with local support groups. For some elderly patients, internet access may not be possible. In those patients, alternative means of information provision such as leaflets can be provided with a telephone number that patients and carers can also access. By offering these additional resources to patients and carers, real meaningful patient involvement may be achieved.

Age UK is another excellent resource for the elderly with information on day centres and local support groups as well as how to access the correct benefits and allowances when needed.

There are many patient information leaflets available which can help not only the patient but also their carers to manage heart failure. This form of supported information delivery is also helpful for some elderly patients who may have cognitive impairment and short term memory loss. Written information can provide them with an easy reference guide on how to manage their condition as best as they can.

Conclusions

Heart failure in the elderly is a chronic condition with significant medical complications. Great attention should be paid to the possible risk of side effects resulting from medications. The overall management of heart failure requires a more practical approach that is specifically tailored to the needs of the older individual. An individualized approach can be delivered by a MDT led by a HFS nurse. Better awareness and recognition of support groups in the community, including the palliative care team, is needed.

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KEY POINTS

- Heart failure is a complex chronic condition with an increasing incidence in the elderly
- Pharmacological treatment in the elderly is challenging due to a combination of side effects, comorbidities and compliance issues
- A multidisciplinary approach is key to improving the patient journey; heart failure specialist nurses are crucial to this approach
- Recognition of the end stage of heart failure is crucial to enable a timely referral to palliative care.