improved by agreement and documentation of a DNAR management plan in advance of surgery and anaesthesia.

In conclusion, we advocate the adoption of the AAGBI guidelines on ‘DNAR Decisions in the Perioperative Period’ into the practice of orthogeriatricians, surgeons and anaesthetists in order to ensure compliance with the recent GMC guidance on ‘Treatment and care towards the end of life: good practice in decision making’ which came into force on 1 July 2010. Hospitals should consider adopting the AAGBI guidelines as policy, and in particular they should consider the use of a DNAR Management Consent Form based on the pro forma included in the guidelines.

Key points

• All DNAR decisions should be reviewed prior to surgery and anaesthesia.
• Modification of the DNAR decision should be documented in the patient’s notes.
• Recent AAGBI and GMC guidelines have been published to guide decision making with pre-existing DNAR decisions.
• Surgical fixation of femoral fractures offers analgesia and mobilisation with favourable outcomes at 1 year for hip fractures with pre-existing DNAR decisions.

Conflicts of interest

None declared.

Cardiovascular disease prevalence, older people

References


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Cardiovascular diseases are largely underreported in Danish centenarians

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Abstract

Background: the substantial decline in oldest old mortality has led to more people surviving to very old age. As morbidity and disability generally increases with age epidemiological research in ageing has focused on the health of oldest olds. However, most studies are based on self-reported or physician-reported information, not objective health information.
Objective: to estimate and compare the prevalence of cardiovascular diseases (CVDs) in Danish centenarians using three different sources of information: self-reported, physician-reported and objective data.
Introduction

It is well established that life expectancy of human beings in developed countries has increased in the last decades, mainly due to a substantial decline in the mortality rate among the oldest [1, 2]. This is also the main explanation for an exponential increase in the number of centenarians [2]. While reliable information about the disability of oldest olds is easy to collect in epidemiological surveys [3], very little is known about morbidity as only few studies have included clinical objective measurements in unselected populations [4, 5]. Self-reported health underestimates true disease prevalence in older populations [6, 7], but is commonly used in ‘hard-to-get’ populations and epidemiological surveys [3]. Yet, with the rising number of very old people it becomes increasingly important to have more accurate data on disease prevalence in order to understand the health of this fastest growing age group in the industrialised world [1]. This paper aims at showing how health may vary depending on the information source: self-reported, physician-reported or objective clinical examinations. We use common cardiovascular diseases (CVD), since they are the leading cause of death in the industrialised world [8], also among 80+ year old [9].

Materials and methods

The study population composed of 276 Danes born between 1 April 1895 and 31 May 1896 and alive on their 100th birthday. Eligible persons were identified in the Danish Civil Registration System and included both community-dwelling and institutionalised persons. Fifty-six persons refused, 13 died before contact was made, leaving 207 centenarians (162 women) in the study (75% participation rate). For details, see [5]. In brief, all participants were interviewed, including self-reported diseases, and examined at their domicile shortly after their 100th birthday. The physical examination included a 12-lead electrocardiogram (ECG) and four arm blood pressure measurements using a Hawksley random zero sphygmomanometer. Additional health information was retrieved from medical records from general practitioners and discharge diagnoses from the Danish National Register of Patients (in existence since 1977). Proxy interviews were allowed. Blood pressure was measured in 158 participants (76%), ECGs were measured in 142 (69%) and coded according to the Minnesota Code (MC) Criteria [10] by trained professionals blinded to the centenarians’ CVD morbidity.

In this paper, we operate with three different levels of information regarding common CVDs:

(A) Self-reported CVD: a history of any of the following diseases: angina pectoris, myocardial infarction (MI), atrial fibrillation, heart failure and hypertension.

(B) Physician-reported CVD: diseases (same list as in A) confirmed in medical records from GPs and hospital discharge records.

(C) Clinically confirmed CVD diagnoses: MI was defined at three different levels according to Ammar et al. [11]: Definite MI: MC 1-1 or 1-2 (excl. 1-2-8) (major or intermediate Q-waves). Probable MI: definite MI and minor Q-waves (MC 1-3) if accompanied by major ST-segment depression (MC 4-1 or 4-2). Possible MI: all Q-waves (MC 1-1, 1-2, 1-3).

Ischaemic ECG pathology: MC 4-1, 4-2 or 4-3 (significant or borderline ST-segment depression); 5-1, 5-2 or 5-3 (deep or moderate T-wave inversion) or 7-1 (evidence of complete LBBB).

Atrial fibrillation: MC 8-3.

Following WHO’s 1999 criteria hypertension was defined as a mean of the measured systolic blood pressures above 140 mmHg or a diastolic blood pressure above 90 mmHg, or a reported history of hypertension that was confirmed by the current use of a hypertensive medication.
Statistical methods

We used Stata/IC 11.1 for Windows for the univariate analyses of self-reported CVDs, physician-reported CVDs and objective examinations, and to calculate Cohen’s Kappa coefficient when analysing the agreement between the self-reported CVDs and the physician-reported CVDs.

Results

Self-reported CVDs

The most often self-reported CVDs were heart failure (16%), angina pectoris (16%) and hypertension (10%), while acute MI and atrial fibrillation were only reported by less than 2% (Table 1). A majority of 133 centenarians (64%) did not report any of these diseases.

Physician-reported CVDs

The most commonly physician-reported CVDs were heart failure (41%), hypertension (35%) and angina pectoris (22%) (Table 1), while one-third could not be identified having any of the listed CVDs. Seven centenarians (3%) had a cardiac pacemaker implanted.

There was a large discrepancy between the prevalence of self-reported and physician-reported CVDs. Although 85 centenarians had a physician-reported heart failure, only 33 self-reported it (39% of physician reported). The same pattern of underreporting by self-report was seen in hypertension (21 versus 73 centenarians) and atrial fibrillation (3 versus 25 centenarians). In general, there was poor–fair agreement between self-reported diseases and the physician-reported diseases. Only angina pectoris reached a Kappa value of 0.5, while all others showed a kappa value below 0.3 (heart failure 0.27, hypertension 0.24).

Clinically confirmed CVD by ECG

Of the 141 centenarians, who accepted to have an ECG recorded, six had a pacemaker and one ECG had too poor a quality to be read. In the remaining 134 ECGs, an ischaemic ECG pathology was present in 46%. Signs of definite, probable and possible MI were found in five (3.7%), 9 (6.7%) and 13 (9.7%) centenarians, respectively, while signs of atrial fibrillation were observed in 22 participants (16%). Of interest, out of 27 centenarians with no physician-reported CVD, only four (15%) had a normal ECG.

Using both physician-reported and ECG diagnoses, 95 (46%) centenarians were identified as suffering from at least one of the diseases: MI (possible), angina pectoris/ischaemia or atrial fibrillation. Adding information on physician-reported heart failure, hypertension and pacemaker the proportion rose to 80% (n = 166).

Discussion

This substudy of an epidemiological, nationwide study of Danish 100 year olds shows that using self-reported health information yields much lower CVD prevalence compared with when using standardised clinical measurements. This was especially the case in hypertension, atrial fibrillation and MI. Therefore, the use of self-reported CVDs can not be recommended to describe the morbidity of oldest olds.

MCs [10] are widely used in epidemiological studies for describing cardiac diseases [12, 13], and codes starting with 1−x can be interpreted as signs of MI. We consider three different levels of MI as proposed by Ammar et al. [11] to show how the prevalence of MI may vary, especially since we do not know the criteria underlying the physician-

Table 1. Number and prevalence proportion of self-reported and physician-reported cardiovascular diseases in Danish 100 year olds born 1895–96

<table>
<thead>
<tr>
<th>Cardiovascular diseases</th>
<th>Self-reported [all (n = 207), n (%)]</th>
<th>Physician reported [all (n = 207), n (%)]</th>
<th>ECG [all (n = 134), n (%)]</th>
<th>Antihypertensive medication or measured hypertension (&gt;140/90) [all (n = 158), n (%)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angina pectoris/ischaemia in ECG</td>
<td>32 (15.5)</td>
<td>46 (22.2)</td>
<td>61 (45.5)</td>
<td></td>
</tr>
<tr>
<td>Definite myocardial infarction</td>
<td>5 (3.7)</td>
<td>9 (6.7)</td>
<td>13 (9.7)</td>
<td></td>
</tr>
<tr>
<td>Probable myocardial infarction</td>
<td>4 (1.9)</td>
<td>9 (4.3)</td>
<td>13 (9.7)</td>
<td></td>
</tr>
<tr>
<td>Possible myocardial infarction</td>
<td>4 (1.9)</td>
<td>9 (4.3)</td>
<td>13 (9.7)</td>
<td></td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>3 (1.4)</td>
<td>25 (12.1)</td>
<td>22 (16.4)</td>
<td></td>
</tr>
<tr>
<td>Heart failure</td>
<td>33 (15.9)</td>
<td>85 (41.1)</td>
<td>100 (63.3)</td>
<td></td>
</tr>
<tr>
<td>Pacemaker</td>
<td>a</td>
<td>7 (3.4)</td>
<td>7 (3.4)</td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>21 (10.1)</td>
<td>73 (35.3)</td>
<td>52 (38.8)</td>
<td>58 (36.7)</td>
</tr>
<tr>
<td>No CVD (none of the above listed)</td>
<td>133 (64.3)</td>
<td>68 (32.9)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

aPacemaker was not part of the structured questionnaire on possible self-reported CVD conditions.
reported MI. Using the more narrow definition of ‘probable MI’ would still show a higher proportion of MI identified in ECGs than in physician reported (6.7 versus 4.3%).

Defining hypertension in very old people is not straightforward, and we acknowledge that the standard WHO guidelines may be too strict for extremely old people. However, studies have shown benefits in lowering blood pressure [14, 15], even in the very old, by lowering rates of death due to stroke and any cardiovascular cause [14, 16]. The centenarians with a current antihypertensive medication may have been treated for many years before reaching 100, and thus active hypertensive treatment may also be seen as the reason for survival to the age of 100. Interestingly, redefining hypertension by using a higher threshold of 150/80 (the HYVET target) (including current use of a hypertensive medication) lowered the number of hypertensive centenarians minimally from 100 (63.3%) to 92 (58.2%). However, using the threshold of 160/100 mmHg, as recommended by the NICE guidelines for treating hypertension in subjects aged 80 and over [17], the proportion of hypertensive centenarians drops to 66 (31.9%). Using this latter definition, the total proportion of centenarians with a CVD declines from 80 to 61% (n = 127).

There are several reasons for the disclosed discrepancies: First, there is a recall-bias, which also includes missing information due to cognitive decline in the participants as well as proxy informants’ lack of knowledge. Second, some of the CVD’s are not recognised as diseases by the participants, because they are adequately treated, e.g. hypertension. Third, MI in older people may cause very subtle symptoms and thus stays unrecognised [18, 19]. Atrial fibrillation is also known to be unrecognised in older persons [20]. Fourth, ageism, i.e. the negative discriminatory practice against old people due to age alone, may result in under-diagnosis or inappropriate treatment [21]. Thus, many reasons may underlie the lower rate of reported CVDs in surveys addressing the health of older people. The strength of this study is the unselected population, a high participation rate (75%), and no significant differences between participants and non-participants concerning gender, number of hospitalisations or residential status [5]. A potential weakness would be not achieving ECG and blood pressure measurements in all participants, but that is rarely feasible in population studies.

Epidemiological studies are carried out in order to assess the prevalence of diseases in populations, and self-reported morbidity remains the easiest way to collect such information. However, our study shows that it is not reliable in oldest olds, as it largely underestimates the true prevalence. We therefore suggest that future studies addressing morbidity of the oldest olds should increase the use of objective health assessments. Also, previous studies on health and morbidity of oldest olds should be interpreted carefully when based on self-reported information.

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Key points

- Low number of centenarians with self-reported CVD.
- Most centenarians have ECG alterations.
- Underestimation of cardiovascular diseases in the oldest old.

Conflicts of interest

None declared.

References

Kidney function in the very elderly with hypertension: data from the hypertension in the very elderly (HYVET) trial

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Abstract

Background: numerous reports have linked impaired kidney function to a higher risk of cardiovascular events and mortality. There are relatively few data relating to kidney function in the very elderly.

Methods: the Hypertension in the Very Elderly Trial (HYVET) was a randomised placebo-controlled trial of indapamide slow release 1.5mg ± perindopril 2–4 mg in those aged ≥80 years with sitting systolic blood pressures of ≥160 mmHg and diastolic pressures of <110 mmHg. Kidney function was a secondary outcome.

Results: HYVET recruited 3,845 participants. The mean baseline estimated glomerular filtration rate (eGFR) was 61.7 ml/min/1.73 m². When categories of the eGFR were examined, there was a possible U-shaped relationship between eGFR, total mortality, cardiovascular mortality and events. The nadir of the U was the eGFR category ≥60 and <75 ml/min/1.73 m².

Using this as a comparator, the U shape was clearest for cardiovascular mortality with the eGFR <45 ml/min/1.73 m² and ≥75 ml/min/1.73 m² showing hazard ratios of 1.88 (95% CI: 1.2–2.96) and 1.36 (0.94–1.98) by comparison. Proteinuria at baseline was also associated with an increased risk of later heart failure events and mortality.

Conclusions: although these results should be interpreted with caution, it may be that in very elderly individuals with hypertension both low and high eGFR indicate increased risk.

Keywords: aged, antihypertensive, hypertension, kidney function, mortality, older people