Conflicts of interest

The authors each declare no conflict of interest.

References

Description of studies using SHU at 12° inclined diet and fludrocortisone had been insufficient to improve orthostatic tolerance. Finally, Kardos described how SHU was used in current clinical practice among experts for the treatment of OH and how it is prescribed.

The structured questionnaire ascertained the respondents’ country and positions in their departments. The rest of the questionnaire was divided into four sections. They were asked (i) if they routinely prescribed SHU, (ii) whether SHU was used before medications, (iii) about the angles and the number of patients prescribed fludrocortisone as well as SHU, and (iv) the reasons for not using SHU. The other modalities of treatment for OH they used were also obtained. Where the respondents gave specific heights of elevation instead of angles, we calculated the corresponding angle of the tilt of the bed. We completed the survey on 31 August 2004.

The structured questionnaire ascertained the extent to which SHU is used in current clinical practice among experts for the treatment of OH and how it is prescribed.

Methods

We carried out a postal survey of medical practitioners who attended an international symposium on syncope in Newcastle upon Tyne, UK, which took place in November 2003. A total of 238 delegates attended the conference, of which 18 non-clinical delegates were excluded. We sent out 220 questionnaires at the first mailing in February 2004. The breakdown of specialty of delegates was as follows: 128 (58%) were in geriatric medicine, 33 (15%) general medicine, 26 (12%) cardiology, 15 (7%) physiology, 11 (5%) neurology and 7 (3%) not determinable. The second mailing was carried out 2 months later to non-respondents. We carried out a postal survey of medical practitioners who attended an international symposium on syncope in New-

Table 1. Blood pressure (BP) improvement from sleeping in a ‘head-up’ position: a review of the literature

<table>
<thead>
<tr>
<th>Author</th>
<th>Patient number</th>
<th>Age range</th>
<th>Patient type</th>
<th>SHU intervention</th>
<th>ΔBP (mm Hg)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>MacLean and Allen [11]</td>
<td>4</td>
<td>30–59</td>
<td>One patient with AF</td>
<td>12° for 3 days</td>
<td>+120/+70</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Three patients with NOH</td>
<td></td>
<td>+102/+64</td>
</tr>
<tr>
<td>Corcoran et al. [12]</td>
<td>1</td>
<td>40</td>
<td>One patient post prolonged bed rest</td>
<td>40° for 2 months</td>
<td>+49/+34</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>One patient with AF</td>
<td></td>
<td>+40/+17</td>
</tr>
<tr>
<td>Bannister et al. [13]</td>
<td>4</td>
<td>45–65</td>
<td>One patient with NOH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ten Harkel et al. [14]</td>
<td>6</td>
<td>23–65</td>
<td>Five patients with AF</td>
<td>12° alone</td>
<td>+11/+5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>One patient with NOH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kardos et al. [19]</td>
<td>1</td>
<td>66</td>
<td>Not specified</td>
<td>12° and fludrocortisone for 1 week</td>
<td>+42/+21</td>
</tr>
<tr>
<td>van Lieshout et al. [15]</td>
<td>8</td>
<td>23–65</td>
<td>Eight patients with AF</td>
<td>15° for 2 weeks</td>
<td>Not available</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12° and fludrocortisone for 3 weeks</td>
<td>+29/+10</td>
</tr>
</tbody>
</table>

AF, autonomic failure; NOH, neurogenic orthostatic hypotension or non-autonomic failure orthostatic hypotension; SDBP, supine diastolic BP; SHU, sleeping with the head of the bed elevated; SSBP, supine systolic BP; UDBP, upright diastolic BP; USBP, upright systolic BP.

ΔBP = [([SSBP_post − USBP_post] − ([SSBP_pre − USBP_pre])/([SDBP_post − UDBP_post] − [SDBP_pre − UDBP_pre])].

*BP denotes the change in mm Hg in supine and upright systolic/diastolic BP post-SHU compared with pre-SHU.
Table 2. The angle of tilt of the bed (based on a standard 75-inch bed), the corresponding height of elevation in inches and the number of medical practitioners prescribing it

<table>
<thead>
<tr>
<th>Angles in degrees</th>
<th>Corresponding height in inches</th>
<th>Number of medical practitioners prescribing this angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;3</td>
<td>&lt;4</td>
<td>6</td>
</tr>
<tr>
<td>3–5</td>
<td>4–6</td>
<td>24</td>
</tr>
<tr>
<td>5.5–10</td>
<td>8–13</td>
<td>14</td>
</tr>
<tr>
<td>12–25</td>
<td>16–32</td>
<td>11</td>
</tr>
<tr>
<td>30–45</td>
<td>38–53</td>
<td>11</td>
</tr>
</tbody>
</table>

Of the respondents, 66 gave specific heights or angles they used. Of these, 44 (67%) used angles <12°. Twenty-four (36%) prescribed angles between 3 and 5° (Table 2). The median [interquartile range (IQR)] angle of elevation was 6.5 (16) degrees. Of the 24 respondents who did not specify angles or heights, some suggested raising the head of the bed using pillows, telephone books, bricks, blocks or heights as ‘high as the patient could tolerate’.

In total, 68 (46%) respondents gave reasons for not prescribing SHU. The main reasons for not using were lack of belief in its effectiveness 37 (54%), patient inconvenience 18 (26%), patient intolerance 16 (24%) and because more effective treatments were available 16 (24%).

Fludrocortisone was the most commonly prescribed treatment with 135 (91%) of the medical practitioners using it for treatment of OH. SHU [79 (53%)] ranked fifth after increased fluid intake [108 (72%)], physical counter-maneuvers [98 (66%) and salt loading [87 (58%)]. Other modalities used were midodrine [74 (50%)], exercise-training [42 (28%)], compression hosiery [29 (19%)], desmopressin [10 (7%)], caffeine tablets, ephedrine and non-steroidal anti-inflammatory medications.

Discussion

Our survey showed that SHU was regularly used by a significant proportion of syncpe experts for the treatment of OH and that geriatricians were the largest specialty involved in this treatment.

The most common angles used were between 3 and 5° (corresponding to 4- to 6-inch elevation). Only a third of those who used SHU were recommending angles for which evidence exists (i.e. ≥12°). It is noteworthy, however, that a significant proportion of respondents were unconvinced about its efficacy or tolerability.

SHU is postulated to work through the renin-angiotensin system (RAS) by reducing overnight natriuresis and diuresis [16], as patients with OH can lose up to 1 kg in weight overnight [17] while recumbent. A reduction in renal arterial pressure by SHU is thought to activate the RAS, which results in sodium and water retention [10]. Given the physiological basis for its perceived mechanism of action, the angle of tilt may be important for efficacy.

Although the original studies demonstrated efficacy at angles of at least 12°, our literature review found a variety of recommendations for SHU angles. The European Society of Cardiology [9] recommends 10–20°, while American physicians such as Bradley and Davis [8] and Engstrom and Aminoff [18] suggest angles of 5–20 and >30°, respectively. Other proponents [6] recommend raising the bed head by blocks or tilting the mattress, rather than the bed, with polystyrene wedges but did not specify an angle.

Some limitations to this study must be acknowledged. We did not ascertain the age range of the patients handled by the respondents although almost two-thirds were geriatricians, suggesting that a significant proportion of patients treated were elderly. Users of this therapy may have been more likely to respond, which may have led to an overestimation of its use. However, a response rate of 67% is good for a study of this type, and the specialty breakdown of respondents was similar to the overall sample.

The evidence for the effectiveness of SHU is sparse, and there is currently no literature to support SHU at <12° or indeed in older people at all. At 12°, some patients have complained of sliding down to the end of the bed [14] and some have developed peripheral oedema, so there must be some concern about compliance when advising older persons to sleep at this degree of elevation.

In conclusion, the conflicting recommendation of SHU angles in the literature is reflected in the lack of clarity in clinical practice. SHU is not an uncommon treatment, being used by more than half of the medical practitioners surveyed. The majority of respondents used smaller angles for which there is no literature support. Further studies are required to determine whether the more commonly prescribed lesser angles are effective and safe in older patients. The mechanisms of action of SHU and its effectiveness in those with and without AF need to be further investigated. Comparison with existing treatments would also be worthwhile.

Further research is required to determine if angles <12° are effective and safe in older patients.

Key points

- More than half of the medical practitioners surveyed used sleeping head-up as a treatment for OH.
- Two-thirds of respondents recommended angles (<12°) for which there is no literature support.

Conflicts of interest

None.

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References


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Appendix

Questionnaire on clinical practice: sleeping in the head-up position

Position in department

- Head of department
- Consultant
- Clinical fellow/registrar
- Nurse specialist
- Others
- Specify

1. Do you routinely advise patient with orthostatic hypotension to sleep with the head of the bed raised?
   - Yes
   - No
   - Sometimes

2. If yes, how high do you ask patient to raise the head of the bed?
   - Degree
   - Exact height not specified (few inches)

3. If no, why not?
   - Patient inconvenience
   - Not tolerated by patients
   - Not convinced it is effective
   - More effective treatment available
   - Others

4. Please tick the following measures you are advising for treatment of orthostatic hypotension (you may choose as many as you like).
   - Drink 1.5–2l of non-caffeinated fluids
   - Salt loading
   - Physical counter-manoeuvres
   - Exercise training
   - Sleep head-up
   - Fludrocortisone
   - Midodrine
   - Desmopressin
   - Others (please specify)

Comments