whereas in wintertime the median was 14.1 ng mL\(^{-1}\) (RC: 11.1 to 22.9) (\(p<0.05\), Fig. 1). With regards to the prevalence of 25OHD deficit, 12% \((n=3)\) of individuals had levels \(<20\text{ ng mL}^{-1}\) in summertime and this increased to 67% \((n=16)\) in wintertime. Levels \(<10\text{ ng mL}^{-1}\) in wintertime were seen in 12% \((n=3)\) of subjects. Moreover, 62% \((n=15)\) of individuals had levels \(\geq30\text{ ng mL}^{-1}\) in summertime, a prevalence that dropped to 8% \((n=2)\) in wintertime.

Hyperparathyroidism was seen in two individuals (8%) in summertime and three (12%) in wintertime. There was an increase in plasma PTH from 45 (11 DS) pg mL\(^{-1}\) in summertime to 56 (15) pg mL\(^{-1}\) in wintertime (\(p<0.05\)). A significant and inverse association was observed between PTH and the condition of normal or deficient 25OHD (\(p<0.05\)).

In summary, this is the first study assessing the prevalence of vitamin D deficiency among anaesthesiologists over different seasons. We found a high prevalence of 25OHD deficiency, especially during wintertime, among anaesthesiologists and anaesthesiology residents, possibly explained by low sunlight exposure and low vitamin D intake. Further studies are necessary to warrant the recommendation of vitamin D screening and supplementation among such caregivers.

**Declaration of interest**

None declared

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**Prediction of postoperative mortality in elderly patients with hip fracture: are specific and geriatric scores better than general scores?**

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Editor—Elderly patients with hip fracture are at high risk of mortality. An accurate prediction of postoperative mortality is important for communicating information, in guiding decision-making, and management. Among preoperative scores, the ASA physical status score does not consider the surgery, makes no adjustment for age, and is subjective.\(^1\) The PreOperative Score to predict PostOperative Mortality (POSPOM) is more accurate but has not been validated specifically in elderly patients.\(^2\) Many geriatric scores focusing on multimorbidity, such as the Cumulative Illness Rating Scale (CIRS)\(^3\) and Charlson comorbidity index,\(^4\) have been proposed but not validated for postoperative prediction, and specific scores, such as the Nottingham Hip Fracture Score (NHFS), have also been proposed.\(^5\) We tested the hypothesis that specific or geriatric scores predict postoperative mortality better than general scores in this frail population.

Data were retrieved from our observational prospective study database carried out in a perioperative geriatric unit in a tertiary teaching hospital.\(^6\) From June 2009 to August 2014, 506 consecutive patients (excluding four patients lost on follow-up) with hip fracture and who were \(\geq70\) yr of age were included as follows: age 86 (7) yr, 76% women, 84% operated within 48 h, and 96% undergoing general anaesthesia. We considered only risk scores available at the preoperative stage, namely ASA physical status, POSPOM, CIRS, Charlson comorbidity index, and NHFS. For NHFS, as the mini-mental score (one point in the NFHS score) was not available in our database, this variable was replaced by...
the presence of dementia. The primary end point was 6 month mortality (14.4%) and the secondary end point 30 day mortality (4.1%). Although 30 day mortality has been widely used in previous studies on postoperative mortality in elderly patients with hip fracture, the risk persists beyond the immediate surgical period and remains high within 6 months after surgery. The areas under the receiver operating characteristic curves were low, suggesting that, even if they exist, these differences are probably not clinically significant.

In conclusion, in elderly patients with hip fracture, specific and geriatric scores are not better than general scores in predicting short- and long-term postoperative mortality in elderly patients undergoing hip fracture surgery. All the scores examined have limited performance; several hypotheses may explain this result. We can assume that they are not able to capture appropriately all the relevant baseline characteristics of this elderly population, such as frailty. The fact that calibrations of these scores were not very good is in favour of that hypothesis. We can assume that factors other than baseline characteristics have a great impact on survival, including, for example, acute condition leading to fall, early complications, or under-utilization of resources to maintain autonomy. The recent demonstration that a dedicated clinical action plan can significantly improve the prognosis of these patients is in favour of this hypothesis.

Our study demonstrated that specific (NHFS) or geriatric scores (CIRS and Charlson score) are not better than general scores in predicting short- and long-term postoperative mortality in elderly patients undergoing hip fracture surgery. All the scores examined have limited performance; several hypotheses may explain this result. We can assume that they are not able to capture appropriately all the relevant baseline characteristics of this elderly population, such as frailty. The fact that calibrations of these scores were not very good is in favour of that hypothesis. We can assume that factors other than baseline characteristics have a great impact on survival, including, for example, acute condition leading to fall, early complications, or under-utilization of resources to maintain autonomy. The recent demonstration that a dedicated clinical action plan can significantly improve the prognosis of these patients is in favour of this hypothesis.

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Table 1 Assessment of the scores to predict 6 month mortality (n=506). Data are values [95% confidence intervals]. The values for ROC AUC and their 95% confidence intervals were calculated and compared using non-parametric stratified bootstrap (n=10000 replicates). The optimal threshold for each score was the value that maximized the Youden index. CIRS, Cumulated Illness Rating Score; NFHS, Nottingham Hip Fracture Score; POSPOM, PreOperative Score to predict PostOperative Mortality; ROC AUC, area under the receiver operating characteristic curve.

<table>
<thead>
<tr>
<th>Discrimination</th>
<th>POSPOM</th>
<th>ASA</th>
<th>CIRS</th>
<th>Charlson</th>
<th>NHFS</th>
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<tr>
<td>ROC AUC</td>
<td>0.66</td>
<td>0.62</td>
<td>0.67</td>
<td>0.64</td>
<td>0.64</td>
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<tr>
<td>ROC AUC 95% CI</td>
<td>[0.59–0.72]</td>
<td>[0.56–0.68]</td>
<td>[0.59–0.73]</td>
<td>[0.57–0.70]</td>
<td>[0.57–0.70]</td>
</tr>
<tr>
<td>P-value</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
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<tr>
<td>Threshold characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Optimal threshold</td>
<td>31</td>
<td>3</td>
<td>10</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Optimal threshold 95% CI</td>
<td>[30–37]</td>
<td>[3–3]</td>
<td>[9–13]</td>
<td>[2–4]</td>
<td>[5–7]</td>
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<tr>
<td>Patients at risk (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Low risk</td>
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<td>9.0</td>
<td>8.3</td>
<td>5.1</td>
<td>8.6</td>
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<tr>
<td>Intermediate risk</td>
<td>67.4</td>
<td>41.9</td>
<td>37.4</td>
<td>77.5</td>
<td>53.4</td>
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<tr>
<td>High risk</td>
<td>45.5</td>
<td>30.8</td>
<td>30.3</td>
<td>43.8</td>
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<td>Predictive performance</td>
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<td></td>
<td></td>
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<td>Sensitivity</td>
<td>0.82</td>
<td>0.67</td>
<td>0.67</td>
<td>0.51</td>
<td>0.74</td>
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<tr>
<td>Specificity</td>
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<td>0.61</td>
<td>0.65</td>
<td>0.46</td>
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<tr>
<td>Positive predictive value</td>
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<td>0.29</td>
<td>0.20</td>
<td>0.15</td>
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<td>Negative predictive value</td>
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<td>0.48</td>
<td>0.48</td>
<td>0.89</td>
<td>0.48</td>
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<td>Positive likelihood ratio</td>
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<td>1.46</td>
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<td>0.58</td>
<td>0.54</td>
<td>0.75</td>
<td>0.56</td>
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References

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Maintaining oxygenation with high-flow nasal cannula during emergent awake surgical tracheostomy

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Editor—Patients presenting with acute upper airway obstruction are at significant risk of morbidity and continue to be managed poorly.¹ Although several approaches can be taken, surgical tracheostomy placement under local anaesthesia is recommended because it ensures patients are kept awake, maintaining airway patency.² This poses several challenges for the anaesthetist, including limited access to the surgical field and risk of complete airway obstruction in a patient with potentially limited reserve.

We recently used a high-flow nasal cannula (HFNC) to maintain oxygenation in a 67-year-old man who underwent emergent awake surgical tracheostomy for upper airway obstruction secondary to an infective acute leukaemic mass. The HFNC (Optiflow System; Fisher & Paykel Healthcare Ltd, Panmure, Auckland, New Zealand) was placed before commencement, and oxygen flow rates were set at 50 litres min⁻¹ through the Optiflow system. Moderate sedation was achieved with i.v. midazolam boluses (total of 3 mg) and remifentanil target-controlled infusion (2–6 ng ml⁻¹). The patient maintained spontaneous breathing, with a patent airway and oxygen saturations 98% or above throughout the procedure.

High-flow nasal cannulation is increasingly used in management of difficult airways,² but its use during placement of an emergent tracheostomy under local anaesthesia for acute upper airway obstruction has not been described. High-flow nasal cannulation is used successfully for preoxygenation, awake fibreoptic intubations,³ acute hypoxic respiratory failure,⁴ during bronchoscopy,⁵ post-extubation,⁶ and to avoid invasive ventilation in respiratory failure.⁷ Its use allows delivery of oxygen at flow rates up to 70 litres min⁻¹, extending apnoeic time, facilitating carbon dioxide elimination, reducing the work of breathing, and providing PEEP.⁷ This extension of apnoea time is useful where airway patency is at risk and time would be required for intervention.

Oxygenation via a face mask is intrinsically limited by the fixed fraction of oxygen being delivered. Non-rebreather masks at 15 l min⁻¹ of oxygen flow generally yield fraction of inspired oxygen of 0.6–0.7, which can be increased with higher flow rates.⁸ Non-invasive ventilation increases mean airway pressure and is an effective preoxygenation technique.² However, it can cause patient distress and is not without risks, including pneumonia, barotrauma, aspiration, and cardiovascular compromise.¹⁰ The presence of absolute or relative contraindications (such as fixed obstruction of the upper airway) may limit its use,¹⁰ and its application under a surgical drape during tracheostomy placement is less practical compared with other methods.

In instances of periarlaryngeal obstruction, the other main approach to securing the airway involves inhalation induction of anaesthesia, with maintenance of spontaneous breathing, and attempting tracheal intubation with direct or videolaryngoscopy.² Patients presenting with severe stridor at rest are unlikely to tolerate a general anaesthetic, and awake tracheostomy is the safest option.² Patients with more chronic obstruction may tolerate an inhalation induction, but this can be associated with increased morbidity, namely risk of laryngospasm, coughing, breath-holding, and failed intubation.²

Awake fibreoptic intubation is considered by many anaesthetists as an optimal solution. However, this procedure is not devoid of risks, as it can result in bleeding, coughing, arrhythmias, increased patient distress, and deterioration of the clinical condition.² Rarely, other options can be considered, namely rigid...