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Pyogenic vertebral column osteomyelitis in adults—modified frailty index correlates with 30-day mortality

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Study design
Retrospective cohort analysis.

Objective
Describe the characteristics of a cohort of patients treated for vertebral column osteomyelitis at a single centre, analyse factors associated with 30-day and one-year mortality with particular focus on the modified Frailty Index.

Summary of background data
Vertebral column osteomyelitis is increasing in incidence globally. Understanding the burden of disease, its characteristics and risk factors for mortality can guide both clinician and patient in treatment choices.

Methods
Retrospective study of 76 patients treated at a tertiary referral centre. Demographic details, disease characteristics, laboratory measures, details on treatment modality and microbiologic results were collected. Comorbid conditions were detailed to calculate the modified Frailty Index.

Results
The mean age was 64.1 years and 77.6% were male. The 30-day and one-year mortality rates were 5.2% and 22.3% respectively. The mean number of conditions calculated towards the mFI was 1.4 (s.d. 1.3), range 0–5. The mFI (R = 0.400) and chronic renal failure (R = 0.332) significantly correlated with 30-day mortality while the number of levels involved (R = 0.334) and age (R = 0.286) correlated significantly with one-year mortality.

Conclusions
Our 30-day and one-year mortality rates were not dissimilar to those reported elsewhere. The modified Frailty Index offers promise as a tool to identify patients with vertebral column osteomyelitis at risk of early mortality and may be of use to both clinicians and patients.

Method
Retrospective audit of all cases of frontal drillout, endoscopic sinus surgery, septoplasty or turbinoplasties performed by a single surgeon across two hospital sites over a 12-month period. Demographic and clinical details including distance travelled from home were collected as were details of timing of discharge and re-presentation to hospital.

Results
A total of 183 patients were identified (95 Hospital 1, 88 Hospital 2). One hundred and seventy-five out of 183 patients (96%) were American Society of Anesthesiologists grade 1 or 2. 0 out of 95 from Hospital 1 (0%) and 22 out of 88 patients (25%) from Hospital 2 lived more than 60km from the hospital. One hundred and seventeen out of 183 patients were discharged the same day (95 out of 95 Hospital 1, 22 out of 88 Hospital 2). Four out of the 117 day surgery patients (3.4%) re-presented to the emergency department within the first 24 hours. All four of these cases were due to bleeding. A total of 12 out of 183 patients re-presented to the emergency department at any point after surgery (6.6%).

Conclusion
Routine same-day discharge after sinus and nasal surgery is achievable, safe and results in an acceptable rate of re-presentation within the first 24 hours (3.4%). Potential barriers include institutional culture, geographic size of the catchment area and patient comorbidities.
Measured implementation of an accelerated chest pain diagnostic pathway in rural primary care

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Aim
To assess the efficacy, safety and feasibility of implementing an Emergency Department Assessment of Chest Pain Accelerated Diagnostic Pathway (EDACS-ADP) using a current generation point-of-care cardiac troponin (POC cTn) assay for rule-out of acute myocardial infarction in patients presenting to rural general practices in the Midland region of New Zealand with suspected cardiac chest pain.

Method
The EDACS-ADP was implemented and evaluated in 12 rural Midland general practices. The primary outcomes assessed were the number of patients identified as low risk managed without transfer to hospital following presentation and major adverse cardiac events (MACE) (myocardial infarction, death, cardiac arrest, revascularisation, shock, arrhythmia) at 30 days.

Results
Between October 2016 and March 2018, 142 patients with chest pain of suspected cardiac origin entered the pathway. Sixty-nine (49%) were male, mean age of 56. Over half were considered low risk, managed and discharged home by primary care. Low risk were more likely to be younger (mean age 53yrs v 63yrs). No MACE was noted in the low risk group. One in 3 patients were assessed as non-low risk and referred to hospital with MACE rate of 15%.

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>30 days MACE</th>
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<tbody>
<tr>
<td>Low risk</td>
<td>80 (56%)</td>
<td>0</td>
</tr>
<tr>
<td>Non-low risk</td>
<td>46 (44%)</td>
<td>7 (15%)</td>
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Conclusion
This rural chest pain pathway has the potential to identify a low-risk population who may be safely managed locally thereby reducing transfer to hospital and allowing more rural autonomy, benefiting both patients, and secondary and tertiary healthcare services. We found that the alpha-wave of anaesthetised patients contains non-sinusoidal components. Sex, age and concentration of volatile anaesthetic drug were significant predictors of alpha-wave sharpness. The artificial sawtooth and square waves both increased the major frequency ratios. Any artefactual increase in sharpness therefore could result in artificial elevation of propriety EEG monitor index values and misguide patient management.

The effect of EEG wave shape on anaesthetic depth calculations

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Anaesthetic depth calculations are based on ratios of frequency information contained in the electroencephalogram (EEG)—brain signals obtained from the scalp. These calculations assume that each neurological process contributes a unique frequency pattern. However, recent research of the effect of deep brain stimulation on EEG beta oscillations suggests that wave shape, a non-sinusoidal feature that is only measurable in the time-domain, can change the frequency ‘signature’ of a neurological rhythmic process—for example, the inclusion of harmonic frequencies. If wave shape variations are present in the EEG of anaesthetised patients, then depth of anaesthesia calculations likely overestimate the patient’s true state. The focus of our research was to investigate alpha-wave shape in the EEG of anaesthetised patients and demonstrate the effect of wave shape on anaesthetic depth calculations.

EEG and patient data was collected prospectively from 305 patients undergoing a general anaesthesia for elective surgery. Alpha-wave shape was categorized by sharpness of the EEG extrema, a measure of how peaked (towards a sawtooth wave) or flat (towards a square wave) the extremum was. The alpha-wave was then artificially modified to either a sawtooth wave or square wave. Common frequency ratios used in anaesthetic depth calculations were calculated before and after the changes.

Single-centre evaluation of metastatic spine disease prognostic tools and development of the metastatic spine risk index

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Background context
Predicting post-treatment survival in patients with spinal metastatic disease is an important consideration when considering treatment options. Most existing scoring systems include a combination of subjective and objective prognostic items that complicate survival prediction, especially in external patient populations.

Purpose
The aim was to compare existing scoring systems and identify key prognostic indicators in the local population. The four scoring systems compared were the Oswestry Spinal Risk Index (OSRI), modified Bauer score (MBS), van der Linden score (VDLS) and New England Spinal Metastasis Score (NESMS).

Study design
This was a retrospective, single-centre study of post-treatment survival.

Patient sample
All patients who had a secondary metastasis to bone between 2006 and 2016 at our tertiary centre were screened for spinal metastatic disease.

Outcome measures
The outcome measure was post-treatment survival in months.
Pathways to thoracic surgery for lung cancer patients—sensitive referral or serendipity?

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Ms Chunhuan Lao,6
Ms Felicity Meikle,1 Mr Nick Odom,1
Mr Paul Conaglen,1
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Purpose
There are concerns that too few patients are diagnosed early enough in general practice to influence outcomes. We wanted to quantify the mechanism of detection in lung cancer patients receiving thoracic surgery in Waikato, New Zealand. This will guide the development and implementation of strategies to increase the detection and treatment of thoracic malignancy in our region.

Methodology
The study sample is a prospectively maintained group of patients who underwent potentially curative thoracic surgery between July 2015 and June 2018 at Waikato Hospital. The primary objective was to identify the mode diagnosis and the symptoms at time of presentation.

Results
Total sample was 128 patients. Mean age is 66 (+/-10.2), M:F 1.3:1, smoking history in 82% and COPD in 34%. Māori represent 25% of patients. Fifty-seven patients were diagnosed as an incidental finding (44%). The main modality of detection was chest x-ray in 79 patients (62%) followed by computed tomography in 36 (30%). Of those that were detected on CT, there was no prior positive chest x-ray (0%). Symptoms at presentation were cough in 66 (52%), dyspnoea in 28 (22%), haemoptysis in 15 (12%), chest pain in 25 (19%), hoarseness in 3 (2%), fatigue in in 15 (12%), weight loss in 23 (18%) and finger clubbing in 5 (4%).

Discussion
There is ongoing conjecture over the most effective respiratory malignancy awareness program. There have been previous examples worldwide with varying results (1–3). This cohort demonstrates cough, dyspnoea, chest pain and weight loss as the most common findings. Just under half of all cases are incidental. Compared to the general population, there is a disproportionately high percentage of the cohort from Māori origin (25%).

The utility of virtual reality surgical simulation in the undergraduate otolaryngology curriculum

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Objectives
Surgical simulation is increasingly used in postgraduate surgical teaching. There are little data, however, about its role in undergraduate medical education. We hypothesised that a temporal bone virtual reality (VR) surgical simulator has utility in the undergraduate curriculum, both as a teaching tool for otology, but also in stimulating students to consider their long-term specialty career plans.

Methods
Demographic, functional, laboratory, imaging, histological and survival data were gathered from the centre’s medical records. Existing prognostic systems along with their individual scoring items were evaluated with univariate and multivariate analysis. Significant items on multivariate analysis were used to design a simple, population-specific and objective scoring system, which was then compared with the existing scores.

Results
In the 11-year period under investigation, 106 patients received a combination of surgery and radiotherapy for spinal metastatic disease. Eleven patients (10%) were still alive at the time of analysis and the mean post-treatment survival time was 13.7 months. All four scoring systems were significantly correlated with survival and had similar concordances. The MBS had the largest coefficient of determination (Cox and Snell’s R2 = 0.18), followed by the NESMS (R2 = 0.14). The OSRI and VDLS were the poorest performing scores in our patient population (R2 = 0.11 and 0.10, respectively). On multivariate analysis, the lung cancer (MBS) and serum albumin (NESMS) items were significant. A system using a modified OSRI primary tumour item and NESMS serum albumin outperformed the MBS (R2 = 0.20).

Conclusions
The present study suggests that the existing scoring systems’ use of functional status and extra-spinal metastases for prognostic purposes is suboptimal. Based on our findings we propose the ‘Metastatic Spine Risk Index’ as a simple and objective tool for predicting survival and can be used in conjunction with other clinical information when considering treatment options.
Method
Participating medical students attended a workshop which involved both didactic teaching around middle ear disease and imaging, and the use of a temporal bone VR surgical simulator to carry out a cortical mastoidectomy. Students filled out a questionnaire on career interests prior to the workshop. Students evaluated the usefulness of the virtual reality surgical simulator, their enjoyment of the experience and any changes in their interest in otorhinolaryngology or surgery in general with a post-workshop questionnaire.

Results
Thirty-two fifth-year University of Auckland medical students were prospectively recruited while completing their otorhinolaryngology attachment at Waikato Hospital during the 2017 academic year. Most students (53.1%) had made some decisions around their career path, although the majority did not think their university experience was sufficient to make this decision (59.4%). The VR surgical simulator experience was useful for stimulating thoughts around career plans (71.9%), providing a hands-on experience (93.8%) and teaching disease processes (93.8%). After the workshop, 50% of students were more interested in a career in surgery, and 53.1% of students were more interested in a career in ORL.

Conclusion
Virtual reality simulation shows promise as a fun and efficient way of teaching surgical specialties such as otorhinolaryngology. If virtual reality was implemented as part of the medical curriculum as a teaching tool, it could also provide students with an experience which helps guide career planning.

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