EDITOR:
We read about the analgesic effects of intrathecal neostigmine in perianal surgery by Yegin and colleagues with great interest [1]. We agree with them, as we found very similar results, that intrathecal neostigmine increases sensory blockade, motor blockade and increases the incidence of adverse effects such as nausea and vomiting. Hood and colleagues in 1995 suggested that intrathecal neostigmine causes increase in analgesia, motor weakness, decrease in deep tendon reflexes, urinary retention, nausea and vomiting in a dose-dependent manner [2]. Lauretti and colleagues in 1996 conducted a study in human beings to evaluate the analgesic action of intrathecal neostigmine quantitatively and showed that neostigmine 100 µg gave better analgesia for somatic pain than visceral pain [3].

We tested the efficacy of intrathecally administered neostigmine methylsulphate for intraoperative and postoperative analgesia, in patients undergoing orthopaedic surgery of the lower limbs. Sixty ASA I–II adult patients were enrolled. The Medical Ethics Committee of Seth G. S. Medical College and King Edward Memorial Hospital, Mumbai, India, approved the study protocol, and written informed consent was obtained from each patient. They were randomly divided into two equal groups. Group A received hyperbaric bupivacaine 0.5% 15 mg (3 mL) plus dextrose 5% (0.5 mL). Group B received hyperbaric bupivacaine 0.5% 15 mg (3 mL) with neostigmine 250 µg (0.5 mL).

Neostigmine prolonged the sensory and motor blockade produced by bupivacaine. The mean duration of sensory blockade was: Group A, 174.50 ± 27.65 min; Group B, 309 ± 62.64 min (P < 0.001). The mean duration of motor block was: Group A, 158.67 ± 25.80 min; Group B, 221 ± 34.37 min (P < 0.001). The mean duration of postoperative analgesia in Group B was 706.66 ± 175.20 min compared to 60.33 ± 45.44 min in Group A. This data suggests that intrathecal neostigmine produces prolonged postoperative analgesia. Nineteen patients of our study group developed nausea and vomiting; all responded to intravenous (i.v.) ondansetron.

Our findings clearly show that intrathecal neostigmine prolongs postoperative analgesia but not without prolonging the motor blockade and causing nausea and vomiting. So in view of the motor blockade and excessive nausea and vomiting caused by intrathecal neostigmine 250 µg, we are unable to recommend its use as a spinal anaesthetic.

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References
EDITOR:
I read with interest the correspondence in the November issue about central venous catheter (CVC) malposition in the azygous arch [1]. I report an interesting case of CVC malposition due to partial anomalous venous drainage. A 47-yr-old male was admitted to the intensive care unit (ICU) after an overdose of amitriptyline, complicated by a lower limb compartment syndrome requiring fasciotomy and subsequently above-knee amputation. By day 4 he required haemofiltration for renal failure consequent upon severe rhabdomyolysis. With strict asepsis a Vascath (catheter A) was inserted into the right subclavian vein together with a large bore multilumen CVC (catheter B) via a left internal jugular approach, neither with technical difficulty. The transduced pressures from both catheters were typically venous. A chest radiograph was taken to confirm position of the respective catheters. It was clear from the radiograph that the tips of the catheters were markedly displaced with catheter B appearing to be malpositioned (Fig. 1). The results of blood-gas analyses from simultaneous analysis of samples taken from each catheter are shown in Table 1. Catheter B was withdrawn by 5 cm and further blood samples were drawn again (Table 1). These results show that the multilumen catheter – inserted via the left internal jugular vein – was sampling oxygenated blood; however, when the catheter was withdrawn by 5 cm, the sampled blood became a ‘venous admixture’. The multilumen catheter was removed uneventfully. The patient was discharged from the ICU 3 days later.

There are two possible explanations for these findings: first, catheter B initially advanced through a patent foramen ovale or an atrial septal defect – this is not supported by the radiographic position of the catheter. Second, catheter B was in a pulmonary vein and communicated with the left innominate vein via the left vertical vein. Partial anomalous pulmonary venous drainage, originally described by Winslow in 1739, is a congenital defect and an incidental finding in 0.7% of cadavers [2]. Anomalous pulmonary venous connections more commonly involve the pulmonary veins of the right lung rather than the left lung. In the most common form, the right upper lobe pulmonary vein drains directly into the superior vena cava or right atrium. Echocardiography, cardiac catheterization and angiography are useful in defining

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**Table 1.** Results of simultaneous blood-gas analysis of samples taken from each catheter, initially and following withdrawal of line B by 5 cm.

<table>
<thead>
<tr>
<th>Catheter</th>
<th>A</th>
<th>B</th>
<th>B withdrawn by 5 cm</th>
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<tbody>
<tr>
<td>PO₂ (kPa)</td>
<td>4.7</td>
<td>12.9</td>
<td>7.5</td>
</tr>
<tr>
<td>PCO₂ (kPa)</td>
<td>5.9</td>
<td>4.8</td>
<td>5.1</td>
</tr>
<tr>
<td>SO₂ (%)</td>
<td>74</td>
<td>98</td>
<td>84</td>
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</table>

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Central venous catheter malposition in an anomalous pulmonary vein
the anatomy of partial anomalous venous drainage. Clinical diagnosis of isolated instances of partial anomalous venous drainage is rare. Where less than 50% of the pulmonary blood flow is shifted from left to right, it is generally asymptomatic and further evaluation is unwarranted. Greater shunt is associated with right atrial and ventricular dilatation leading to the development of dysrhythmias, right-sided heart failure and rarely pulmonary hypertension. About 10% of all patients with atrial septal defects will have anomalous pulmonary venous connections [3].

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References

A double-lumen tube technique for selective lobar isolation

EDITOR:
A 72-yr-old female (height 162 cm, weight 55 kg) was admitted to our Intensive Care Unit (ICU) because of acute respiratory failure (PaO\textsubscript{2}/inspired O\textsubscript{2} fraction (FiO\textsubscript{2}) 10.3 kPa). On admission, her trachea was intubated with a 7.5 mm inner diameter endotracheal tube (Portex, Kent, UK) and lungs mechanically ventilated in a pressure-regulated volume-controlled mode (Siemens 300C®, Berlin, Germany). Tidal volume was set at 380–400 mL, respiratory rate 20 breaths min\textsuperscript{-1}, externally applied positive end-expiratory pressure (PEEP) 0 cmH\textsubscript{2}O. The achieved PaO\textsubscript{2}/FiO\textsubscript{2} was 12 kPa. The patient was sedated with propofol (4 mg kg\textsuperscript{-1} h\textsuperscript{-1}). The admission chest radiograph revealed diffuse, bilateral pulmonary infiltrates. She had no prior history of chronic inhalation of dusts causing inflammation and pulmonary fibrosis. Microbiological, serological and imaging investigations for patients with suspected interstitial lung disease [1] failed to establish a definitive, causal diagnosis. Thus, surgical lung biopsy [1–4] under selective lobar collapse [5] was decided.

For selective left upper lobar collapse, the following technique was employed.

(a) Determination of left mainstem bronchus length. A 3.4 mm fibreoptic bronchoscope was inserted through the original endotracheal tube; the upper incisor-to-carina distance (23.5 cm) was determined by subtracting the endotracheal tube connector-to-upper incisor length (part of endotracheal tube protruding from the patient’s mouth) from the fibreoptic bronchoscope insertion length at the level of carina (endotracheal tube connector-to-carina); in a similar way, the upper incisor-to-left upper bronchus orifice distance (26.0 cm) was determined by subtracting the endotracheal tube connector-to-upper incisor length from the fibreoptic bronchoscope insertion length at the level of the left upper bronchus orifice; lastly, the difference of the aforementioned distances yielded the left mainstem bronchus length (2.5 cm).

(b) LUL isolation. Additional propofol (1 mg kg\textsuperscript{-1}), fentanyl (3 µg kg\textsuperscript{-1}) and cisatracurium (0.2 mg kg\textsuperscript{-1}) were given. Then the original endotracheal tube was replaced by a 37-FG, left-sided, double-lumen tube.

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Accepted for publication January 2003 EJA 1388
BronchoCath®; Mallinckrodt Medical Inc., St. Louis, MO, USA); the double-lumen tube was inserted to the 28.0 cm mark at upper incisor level, and the inflation of both tracheal and bronchial cuffs resulted in the desired selective LUL isolation (Fig. 1).

(c) Confirmation of LUL isolation. A fiberoptic bronchoscope inspection via the tracheal lumen of the double-lumen tube revealed the carina and both mainstem bronchial orifices; on inspection through the bronchial lumen only the segmental left lower bronchial orifices were visualized; on chest auscultation, with both double-lumen tube cuffs inflated, breath sounds were diminished solely over the left upper lobe.

In the right lateral decubitus position, the desired double-lumen tube positioning was reconfirmed as above. Following left upper lobe collapse [5], an uneventful videothoracoscopic biopsy of the left upper lung was performed within 40 min. Intraprocedural ventilator settings were: FiO₂, 1.0; tidal volume, 350–360 mL; respiratory rate, 23 breaths min⁻¹; inspiratory time-to-total respiratory cycle time ratio 0.5; externally applied PEEP 0 cmH₂O. Peak, plateau and mean airway pressures were 45–46, 28–30 and 8–9 cmH₂O, respectively; intrinsic PEEP was 2 cmH₂O. PaO₂ was maintained ≥8 kPa throughout the procedure.

In patients in respiratory failure with a short (≈2.5 cm) left mainstem bronchus [6], we recommend our selective left upper lung isolation technique for open lung biopsy. The left lower lobe can still be ventilated through the left endobronchial lumen of the double-lumen tube and the right lung is ventilated through the tracheal lumen. This is likely to minimize the risk of intraoperative hypoxaemia.

Figure 1.
Selective isolation of the left upper lobe with the left-sided double-lumen tube inserted to the 28 cm mark.

References
2. Popper HH. Which biopsies in diffuse infiltrative lung diseases and when are these necessary? Monaldi Arch Chest Dis 2001; 56: 446–452.
Cervical osteophytes are common in the elderly (20–30%) [1], rare before 50 yr of age and occur more frequently in males than in females. They are most often due to a degenerative arthritis within the spine, but may be part of diffuse idiopathic skeletal hyperostosis (DISH). Symptoms arising from cervical osteophytes are unusual, but dysphagia is the commonest complaint. We describe a case of life-threatening airway obstruction due to cervical osteophytes.

An independent 79-yr-old female tripped at home and fell onto her face. She had a past medical history of a cerebrovascular accident, with no residual neurological deficit, and hypertension and hyperlipidaemia. She managed to telephone for an ambulance and walk towards the paramedics as they entered her house and gave a history. However, soon after this she complained of difficulty in swallowing and subsequently of breathing. Examination in the resuscitation room showed obvious gross neck swelling and marked respiratory distress: sudden complete loss of the airway occurred. Despite senior assistance, endotracheal intubation proved impossible at this time because of the swelling, oedema and anatomical distortion combined with brisk fresh bleeding arising from within the oropharynx. It was felt that the patient’s pharynx was too swollen to insert a laryngeal mask airway. She then developed pulseless electrical activity secondary to hypoxia – cardiac output was restored after one cycle of cardiopulmonary resuscitation and an emergency airway was provided by needle cricothyroidotomy until attempts at blind oral intubation with a size 6 endotracheal tube were successful. Primary and secondary surveys elicited the previously mentioned neck swelling and a haematoma over the left eyebrow, but were otherwise unremarkable.

Plain lateral cervical spine radiographs demonstrated large anteriorly directed osteophytes in the mid-cervical region. A computed tomographic (CT) scan of the patient’s head showed mild cerebral atrophy, but nothing else of note. Further CT images of the patient’s neck (Figs 1 and 2) were reported as showing ‘extensive pronouced soft tissue attenuation in the pre-vertebral and peri-vascular spaces extending from the base of the skull to beyond the root of the neck, with anterior displacement of the trachea and oesophagus’. There was a very slight widening of the C3/4 disc space with a locule of gas within the space, which raised the possibility of disruption of the anterior longitudinal ligament secondary to a hyperextension injury.

The patient was managed conservatively in our intensive therapy unit. Surgery and attempts to identify and ligate the bleeding point were considered futile. After 48 h, the prevertebral swelling started to subside and oral bleeding abated. An air leak was detected when the tracheal tube cuff was deflated. The amount of sedation was reduced and the patient responded to the nursing staff appropriately and obeyed commands. No focal neurological signs were detected. Unfortunately, the patient developed severe hypertension and her level of consciousness deteriorated on the fourth day after admission: a second CT head scan revealed a large cerebral infarct. Active treatment was withdrawn at this stage and the patient died soon afterwards.
We made a presumptive diagnosis of massive cervical haematoma secondary to trauma caused by anteriorly facing osteophytes during a hyperextension injury.

The most common symptom arising from cervical osteophytes is dysphagia [2]. The oesophagus is often deviated, and dysphagia arises either from mechanical obstruction or from inflammation in the area of the osteophyte. Aspiration pneumonia has also been reported. Management of this condition is predominantly medical using anti-inflammatory agents, muscle relaxants, and speech and language therapy advice. Surgical intervention should be reserved for the most severe or resistant cases and is not without risk [3].

Upper airway obstruction and stridor are rare but have been reported and they may be due to a number of different mechanisms. Direct laryngoscopy in our patient confirmed a narrowed supralaryngeal airway due to extrinsic compression by anterior vertebral osteophytes. The laryngeal inlet was normal distal to the bulge. The patient required a tracheostomy under general anaesthetic, because endotracheal intubation was impossible, and the airway was secured with a microlaryngoscopy tube. Hassard [4] reported two patients who had emergency tracheostomy formation for airway obstruction with prominent anterior osteophytes. These patients had suffered postcricoid ulceration, thought to be due to constant movement of the cricoid lamina over a projecting osteophytic mass. This was associated with impaired voice.

Crosby and Grahovac [5] presented diffuse idiopathic skeletal hyperostosis as an unusual cause for difficult intubation. They felt that difficulty in intubation arose from a number of problems, including an immobile neck, mechanical obstruction and anterior displacement of the larynx. They went on to state that these difficulties were encountered despite preoperative airway assessment suggesting normal flexion and extension of the neck and a Mallampati Class I airway assessment. Broadway described a similar experience where a difficult intubation was not anticipated at preoperative assessment, yet became evident following induction of anaesthesia [6]. He re-emphasized that when tracheal intubation was planned, predictive tests could be useful but that the unexpected could still occur.

Figure 2.
Reconstructed CT scan of the cervical spine (sagittal view) showing anteriorly directed osteophytes at C5 (arrow).

References

Morphine-sparing effect of nefopam by continuous intravenous injection after abdominal surgery by laparotomy

EDITOR:
The concept of combined analgesia during the postoperative period is now well documented and widely used. Its principle is based upon the administration in combination of analgesics of different classes that do not share the same mechanism of action. The objective is to reduce the dose of each of the combined medicines, leading to fewer adverse effects for the same level of analgesia [1].

Nefopam is an analgesic proposed for several years. Its main characteristic is an analgesic effect with a mechanism of action different from that of opiates and non-steroidal anti-inflammatory drugs. Its morphine-sparing effect is well admitted but has been associated with adverse effects in earlier studies using intermittent intramuscular (i.m.) [2] or intravenous (i.v.) [3] injections of nefopam. We, therefore, undertook a prospective randomized double-blind controlled trial to evaluate the morphine-sparing effect of nefopam when used as a continuous i.v. infusion.

After ethical committee approval and informed consent, 64 patients undergoing scheduled surgery under general anaesthesia were assigned to one of two postoperative analgesia protocol groups. Inclusion criteria were ASA Grades I–III, adult age, male or female gender, and supra- or sub-mesocolic abdominal surgery via laparotomy under general anaesthesia. Exclusion criteria were ineffective or unsuitable analgesia not relieving the patient and requiring a change of treatment, further surgery and postoperative complications requiring discontinuation or change of the analgesic treatment.

Preoperative premedication was with midazolam. The anaesthesia protocol was standardized, with induction using a combination of thiopental, remifentanil and rocuronium to facilitate endotracheal intubation, followed by maintenance anaesthesia using isoflurane, remifentanil and rocuronium. Postoperative analgesia for all patients was with propacetamol (the prodrug of acetaminophen (paracetamol)) 2 g by slow i.v. injection 40 min before the remifentanil was stopped, and an i.v. injection of morphine 0.15 mg kg$^{-1}$ 20 min before the remifentanil was stopped.

Morphine titration (3 mg 10 min$^{-1}$ until a visual analogue score (VAS) of 3/10 was obtained) was started immediately after extubation in the postoperative recovery room, followed by random assignment between two groups to the nefopam group (continuous infusion of Acupan® 80 mg i.v. day$^{-1}$ during 2 days) or the placebo group (continuous infusion of physiological saline for 2 days). Treatment was otherwise the same in both groups, i.e. patient-controlled i.v. morphine (100 mg PCA cassette, concentration 1 mg mL$^{-1}$, bolus 1 mg, refractory period 7 min, maximum dose 20 mg h$^{-1}$) administered for 48 h and i.v. propacetamol 2 g every 6 h.

The primary end-point was the cumulative dose of self-administered morphine during the first 48 postoperative hours. Other parameters of interest were pain scores (VAS) at rest, evaluated in postoperative recovery room at 10, 20, 30 min, 1, 2 h after extubation, and on the ward every 4 h. We also recorded haemodynamic and respiratory variables. Particular attention was paid to adverse effects: sweating, nausea, tachycardia, palpitations, vertigo, agitation, irritability, hallucinations, convulsions, respiratory depression and pruritus.

Results are expressed as mean ± SD. Patient characteristics data were compared using a $\chi^2$ test for qualitative data and $t$-test for quantitative data. Cumulative doses of morphine were compared using a $t$-test.

Pain scores (VAS) and haemodynamic variables were compared by analysis of variance with repeated measurement in time and a Tukey test when analysis of variance showed significance. The incidence of adverse events was compared using a $\chi^2$ test.

Two of the 64 patients were excluded: one in the placebo group because of bradypnoea requiring interruption of the administration of morphine and the other in the nefopam group since he had accidentally received i.v. ketoprofen in the recovery room. Hence, data from 62 patients were analysed. The two groups were similar regarding patient characteristics data (age, gender, weight and height) and type of surgery (Table 1).
At the end of the 48 h observation period, cumulative morphine consumption was 58 ± 28 mg in the placebo group and was 39 ± 28 mg in the nefopam group (P < 0.01). There was no evidence of any statistical difference in analgesic efficacy throughout the 48 h of postoperative period (Fig. 1). There was no significant difference in the incidence of adverse effects (Table 2). Other secondary end-points, i.e. heart rate, systolic and diastolic arterial pressure, oxygen saturation and respiratory rate were equivalent.

Up to now, there have been few studies quantifying the morphine-sparing effect of nefopam given by continuous i.v. administration, and none studied the analgesic effect of this drug after laparoscopic supra- or sub-mesocolic surgery. A recent study [3] showed the analgesic efficacy of nefopam given by intermittent i.v. injections of 20 mg 4 h⁻¹ compared with i.v. propacetamol and placebo in combination with morphine–PCA after liver resection. In the nefopam group, the morphine-sparing was 50% at 24 h after operation compared with the control group, and analgesia was improved. However, there was more frequent sweating, and patient satisfaction was not impaired. Other studies, all with intermittent administration protocols, have confirmed this analgesic efficacy [2,4–6]. This study quantified a marked 33% morphine-sparing effect of nefopam, proving its analgesic efficacy by continuous i.v. administration for a period of 48 h after various types of laparoscopic abdominal surgery. The absence of adverse effects, in particular sweating or nausea, is probably due to continuous i.v. administration, avoiding the peaks associated with periodic administration as used in earlier study protocols. Analgesic quality evaluated by VAS scores was similar in both groups despite a lower morphine consumption in the nefopam group, proving its analgesic efficacy.

In conclusion, we found that the continuous i.v. administration of nefopam resulted in a morphine-sparing effect of about 33% during the first 48 h after supra- or sub-mesocolic abdominal surgery via laparotomy. The combination of morphine and non-morphine analgesics by continuous administration could provide adequate postoperative analgesia without increasing the risk of adverse drug reactions.

Table 1. Patients’ characteristics (n = 31).

<table>
<thead>
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<th></th>
<th>Nefopam</th>
<th>Placebo</th>
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</thead>
<tbody>
<tr>
<td>Gender (m/f)</td>
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<tr>
<td>Age (yr)</td>
<td>59 ± 15</td>
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<tr>
<td>Height (cm)</td>
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<tr>
<td>Weight (kg)</td>
<td>67 ± 14</td>
<td>68 ± 16</td>
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<tr>
<td>Surgery</td>
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</table>

Values are mean ± SD.

Table 2. Adverse effects (n = 31).

<table>
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References


