The sleep apnoea syndrome and epidural morphine

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A patient not known in advance to have the sleep apnoea syndrome (SAS) was administered a combined epidural-general anaesthetic for a proposed radical prostatectomy. After surgery which had to be discontinued due to extensive tumoural spread, morphine 5 mg was administered through the epidural catheter for analgesia. Severe respiratory depression occurred eight hours later and was successfully reversed by repeated injections of naloxone. The potential danger of epidural morphine administration to SAS patients is discussed.

Respiratory depression following administration of epidural morphine has been widely reported[1–3] and the incidence of severe respiratory depression could vary from 0.25 to 0.45 per cent.[3] However, a prospective study on volunteers has been shown that some degree of respiratory depression could be demonstrated by blood gas analysis in all subjects six hours after epidural administration of opiates.[4] It is also believed that patients with sleep apnoea are more susceptible to respiratory depression after sedative and narcotic administration.[5] A case of very severe respiratory depression following epidural morphine occurring in a patient not known in advance to have the sleep apnoea syndrome (SAS) is reported.

Key words
COMPLICATIONS: sleep apnoea syndrome;
ANAESTHETIC TECHNIQUES: epidural; ANALGESICS: morphine

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Case report

A 65-year-old man with prostatic carcinoma unassociated with any neoplastic syndrome and free of respiratory and apparent neurologic diseases was scheduled for suprapubic radical prostatectomy. This 172 cm, 82 kg man was already under treatment for hypertension with propranolol 160 mg/day and hydrochlorothiazide 50 mg/day. His past history included surgery four years earlier for aortorenal bypass grafting, without complications.

On the morning of surgery the patient was premedicated with lorazepam 3 mg p.o. The planned anaesthetic for this lengthy operation consisted of an intermittent epidural technique supplemented by general anaesthesia. A lumbar epidural anaesthetic with bupivacaine 0.5 per cent and epinephrine 1:200,000, 18 ml, for a T_6 sensor level was initiated, followed by the induction of general anaesthesia with alfathesin 10 ml, succinylcholine 100 mg and endotracheal intubation. Anaesthesia was maintained with droperiodol 5 mg, fentanyl 100 μg, enflurane 0.5 per cent in a 60/40 mixture of oxygen-nitrous oxide. D-tubocurarine was administered for initial control of ventilation. At laparatomy, the operative plan was abandoned and surgery terminated two hours after induction because of extensive lymphatic spread. Potential residual curarization was then reversed with atropine 1.2 mg and neostigmine 2.5 mg and the patient was extubated.

In the recovery room, the patient was fully conscious but in pain and was administered morphine 5 mg diluted in saline 10 ml through the epidural catheter, for postoperative analgesia. Ninety minutes later blood gas analysis showed: PaO_2 15.10 kPa (113.5 torr), $PaCO_2$ 6.5 kPa (45.5 torr) and HCO_3^- 25.7. Due to lack of available space in the intensive care unit, he was discharged to the ward four hours after the epidural morphine administration. His condition was described as satisfactory by the ward nurses. He was

wide awake and painless for the first three hours after which he became obtunded. Eight hours after the epidural morphine injection, the patient could not be aroused, showed apnoeic spells and became deeply cyanotic. Blood gases done during the ensuing resuscitation showed extreme respiratory depression with PaO_2 2.95 kPa (22.2 torr), $PaCO_2$ 9.06 kPa (68.1 torr), pH 7.17 and HCO_3^- 23.4. He was ventilated with 100 per cent oxygen and administered four successive injections of naloxone for a total dose of 1.6 mg over a five minute period. Blood gases done after the resuscitation were normal. The patient recovered completely and without further problems. In the following days, pain control was achieved with meperidine 75 mg and promethazine 25 mg by intramuscular prn injections, without clinically apparent respiratory depression.

Later the patient was questioned about his sleeping habits. According to his wife, he was an intolerable snorer, had been having apnoeic spells during his sleep and was suffering from excessive daytime sleepiness. After neurological evaluation, diurnal polygraphic somnography showed during 12 consecutive minutes of sleep 28 episodes of central sleep apnoea lasting from 12 to 18 seconds and occurring in phase II sleep. A diagnosis of the central sleep apnoea syndrome was made.

Discussion

The delay of onset of respiratory depression following the administration of epidural morphine is thought to be due to slow rostral spread of opiate-containing cerebrospinal fluid which reaches the brain stem by the sixth hour.[6] Clinical respiratory depression with appropriate doses of morphine is a relatively rare occurrence (0.5 per cent of all cases)[3] and is probably dose-dependent.[3,4] In most instances it is a dramatic event that can lead to fatal outcome if it is not detected.

To our knowledge, the association of sleep apnoea and severe respiratory depression after epidural morphine analgesia has not been reported. Cases of fatal and near fatal respiratory obstruction following intramuscular injections of diazepam, chlordiazepoxide and morphine have been reported in SAS patients.[5] Although little is known about the mechanism of obstructive and mixed sleep apnoea, even less is known about central apnoea. The terminology by itself is confusing as it appears that all types of apnoea imply a central mechanism. Obstructive sleep apnoea seems to be related to a failure or inadequate respiratory activation of the upper airway muscles.[7] Central apnoea implies a failure of respiratory rhythmogenesis[7] and has been reported in intubated and tracheostomized patients with depressed respiration.[8,9] In mixed SAS both mechanisms are involved. As the sensitivity of the respiratory centre to depressants is well known, it would appear logical to avoid them whenever the sleep apnoea syndrome is suspected. Loud snoring, excessive daytime somnolence and apnoeic spells during sleep are usual features of the syndrome.[7] The obstructive and mixed SAS are met mostly in stocky and obese males often showing upper airway abnormalities. Central SAS is more frequent in patients of normal weight with normal airways. Epidemiologic studies have shown that SAS may affect as much as 3.5 per cent of the male population over 40 years of age and as much as 25 per cent over age 65.[10] The best anaesthetic management should consist of regional anaesthesia, whenever possible. The second best would be inhalation anaesthesia. Premedication should be avoided.[5,9]

In the present case report, as sleep apnoea was unsuspected beforehand, relatively heavy premedication (lorazepam 3 mg p.o.) was administered, without significant respiratory depression or obstruction. As the surgery planned (radical prostatectomy) was lenghthy and extensive, epidural anaesthesia, supplemented by general anaesthesia, was induced with the purpose of maintaining effective postoperative analgesia in the intensive care unit.

Respiratory depression occurred eight hours after epidural morphine and was very severe. As respiratory depression caused by epidural morphine tends to be more profound than with subcutaneous and intramuscular administration,[4] we feel that suspected sleep apnoea patients should never receive epidural morphine. Moreover, whenever epidural morphine analgesia is used in any patient, postoperative extended monitoring is mandatory. The patients should never be discharged to wards where monitoring is likely to be sporadic.[11]

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Résumé

Une anesthésie générale associée à une épidurale continue a été administrée a un porteur insoupçonné d'apnée du sommeil pour une prostatectomie radicale qui dut être abandonnée parce que non réalisable. Pour fins d'analgésie postopératoire, 5 mg de morphine furent administrés par le cathéter épidural. Il en résulta une dépression respiratoire très grave qu'on a pu renverser par des injections répétées de naloxone. Les dangers potentiels de l'administration de morphine épidurale chez les porteurs du syndrome d'apnée du sommeil sont discutés.