

Medicinal mishap

Monitor morphine

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Case

A 29-year-old woman presented to her general practitioner, having become unwell overnight with a sore throat. She was shivering, had muscle aches and a headache. Her past medical history included tonsillitis and migraine.

The general practitioner found exudate or pus on the woman's tonsils and her cervical lymph nodes were enlarged. Bacterial tonsillitis was diagnosed and the doctor took a throat swab. He gave the patient intramuscular procaine penicillin and a prescription for phenoxymethylpenicillin. Ibuprofen was recommended for symptomatic treatment.

Next morning, the patient was still unwell and contacted her general practitioner several times. He made a house call around 6.30 pm, by which time the patient was complaining of headache, nausea and vomiting. On examination her tonsils were still swollen, but a 'thick tonsillar membrane' made the doctor think the diagnosis could be glandular fever. He thought this may have brought on a migraine.

The general practitioner decided to give intramuscular morphine and metoclopramide. After estimating the patient's weight he gave a dose of 30 mg morphine from his doctor's bag supplies.

By midnight the patient's headache had returned and she was vomiting, so her husband called the doctor again. The general practitioner, who had been working since 5 am, had only got home a short time before the call. He decided not to see the patient again, but to admit her to the local hospital.

This was a small country hospital which only had two nurses on duty at night. The doctor spoke to one of the nurses and gave an order for intramuscular morphine and prochlorperazine. At a quarter to one in the morning, 30 mg morphine was given.

The nurses decided to make observations of the patient's pulse, blood pressure, temperature and respiration every four hours.

One nurse then went to attend to a mother and newborn baby, while the other went into another room for a couple of hours. Each nurse assumed the other would do the regular round of all patients at 2 am.

At 3.15 am the nurse who had attended the new mother checked the patient. The woman was lying prone with her face in the pillow. She was not breathing. Resuscitation started and the doctor was called. He arrived quickly and intubated the patient, but she could not be revived.

A post-mortem examination found enlarged tonsils with narrowing of the upper airway. The diagnosis of glandular fever was confirmed. The blood concentration of morphine was found to be 0.16 mg/L. Death was attributed to respiratory depression

caused by morphine intoxication on a background of upper airways narrowing which was a consequence of infectious mononucleosis.

Comment

Morphine is an appropriate drug for severe acute pain, but it is not usually recommended for migraine. The dose to use is determined by the patient's age, not their weight. For a 29-year-old woman, the recommended intramuscular dose is 7.5–12.5 mg which can be repeated after two hours, depending on the response. The dose is adjusted according to the response, so patients need to be observed more frequently than four-hourly.

There is an overlap between the therapeutic and toxic concentrations of morphine. Although 0.16 mg/L is within the therapeutic range, this concentration was too high for someone who had not been taking morphine regularly.

Therapeutic doses of morphine cause respiratory depression. The effect increases with the dose and respiratory arrest is a frequent cause of death in overdose. Metoclopramide and prochlorperazine would have added to the sedative effects of the 60 mg morphine the patient received over five hours.

In many hospitals it is mandatory for nursing staff to monitor a patient's pain score and sedation score after giving an opioid. If the patient is being observed, respiratory depression should be detected. It can be managed by giving naloxone, an opioid antagonist. There is a rapid response to an injection of naloxone, although its effect may wear off faster than the effect of morphine.

Conclusion

Patients who have not previously been taking opioids should start with a low dose of morphine. If the subcutaneous or intramuscular route is used, the first dose should be determined by the patient's age.

Hospitals should have protocols for observing patients who have been given opioid analgesics. This is to assess the response and to monitor for adverse effects, particularly respiratory depression.

Further reading

Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine. Acute pain management: scientific evidence. 2nd ed. 2005. www.anzca.edu.au/resources/books-and-publications/acutepain.pdf [cited 2009 Jan 13]

Macintyre PE, Schug SA. Acute pain management: a practical guide. 3rd ed. Edinburgh: Elsevier Saunders; 2007.

Prepared with the assistance of the general practitioner and clinical pharmacologist involved in the case.