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Lesson of the Week

Opiate toxicity in elderly patients

T H CARADOC-DAVIES

Opiate drugs are used to relieve pain and dyspnoea in patients with myocardial infarction and left ventricular failure. The usual doses of diamorphine are 5 mg intravenously or intramuscularly,¹ and morphine 10 mg intravenously or intramuscularly, both repeated if necessary. This gives relief to most patients. An elderly woman was recently admitted with myocardial infarction and left ventricular failure. She was unconscious and cyanosed with pinpoint pupils. She had received a "standard" dose of opiate, and her striking response to treatment with naloxone prompted me to collect similar cases.

Case reports

Over three months there were about 450 acute admissions to the geriatric unit of this hospital. All of the patients were aged over 75 years. Seven cases of opiate toxicity were detected: three admitted by general practitioners, three from a casualty department, and one in a ward bed. The criteria were the triad of pinpoint pupils, low level of consciousness, and depressed respiration (all were deeply cyanosed); response to naloxone; and confirmation that an opiate had been given. The following features were recorded after a clinical examination: level of consciousness, simple neurological examination, pulse rate, blood pressure, colour and respiration, and signs of left ventricular failure. Arterial blood gases were not measured owing to the urgency of giving naloxone to the patients. Electrocardiograms were taken and the concentration of cardiac enzymes measured to establish the presence or absence of myocardial infarction. A chest x-ray examination confirmed the clinical impression of left ventricular failure. Information about the dose and the route and time of administration of the narcotic and other drugs was established.

The data from the seven patients were analysed. (a) Age range

Elderly patients may suffer from opiate toxicity unless they are given less than the normal adult dose intravenously

75 to 90 years. (b) Indications for treatment with an opiate: pain only in three patients, dyspnoea in two, and both in two. (c) Blood pressure was low in three, compared with previous or subsequent readings. In one patient (case 5) it rose after treatment with naloxone. (d) Other drugs: patients with left ventricular failure had all received frusemide, one had received aminophyllin. Two patients (cases 1 and 4) had been given perphenazine prophylactically with heroin. Those who had received Cyclimorph also received cyclizine, which it contains. (e) The time from when the opiate was given to reversal ranged from 15 minutes to seven hours. (f) Outcome: five patients had sustained myocardial infarction, and three of these died (cases 2, 4, 6 of persistent hypotension, sudden death, and in left ventricular failure, respectively). (h) Chest pain and severe dyspnoea did not recur after reversal with naloxone in any patient.

Case 6, who had received 20 mg of heroin, required 0.8 mg of naloxone before responding and needed a further 0.4 mg after six hours, suggesting that diamorphine has a longer half-life than naloxone in elderly patients.

Discussion

The mode of action of the opiates in patients acutely ill with myocardial infarction or left ventricular failure is not clearly understood. The results from different studies are conflicting.²⁻⁶ Opiates certainly act centrally in reducing dyspnoea, pain, and sympathetic drive, which may be vitally important in reducing cardiac output and lessening the chance of life-threatening arrhythmias occurring. There may be peripheral actions on resistance and capacitance vessels.

The common side effects may be grouped as central: nausea, vomiting, and respiratory depression; and peripheral: hypo-

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Data on patients

Case No	Age (years)	Blood pressure (mm Hg)	Opiate	Antiemetic	Naloxone (mg)	Response	Myocardial infarction	Survived
1	87	120/80	Diamorphine 3 mg IV	Perphenazine 5 mg IM	0.4	Good	—	Yes
2	75	90/60	Diamorphine 10 mg IM	—	0.4	Moderate	+	No
3	90	230/100	Morphine 10 mg IV	Cyclizine 50 mg IV	0.4	Good	—	Yes
4	78	110/80	Diamorphine 10 mg IM	Perphenazine 10 mg IM	0.4	Good	+	No
5	78	110/70	Diamorphine 5 mg IV	—	0.4	Moderate	+	Yes
6	81	130/100	Diamorphine 10 mg IV	—	0.8 + 0.4	Moderate	+	No
7	83	130/70	Morphine 15 mg IM	Cyclizine 50 mg IM	0.4	Good	+	Yes

Good = conscious, not cyanosed. Moderate = rousable, slight cyanosis.

tension, usually postural, very occasionally catastrophic with bradycardia. All of these, including respiratory depression, may be minimised by using small doses of opiates and keeping the patients lying down.⁷ Diamorphine seems to be no safer than morphine, and because it easily passes through the blood-brain barrier it may be more toxic. Heroin given intravenously is said to be two or three times more potent than morphine.⁸

The metabolism of drugs in elderly people is different from that in young people. The plasma half-life is longer, thus requiring increased intervals between doses. It has been said that the initial doses need not be reduced,⁹ but the patients reported on here show that this is not correct. The tendency to opiate toxicity in elderly patients may be due to a combination of reduced respiratory/cardiovascular reserve and altered tissue sensitivity, as well as altered drug handling.

There is an association between hypoxia and mortality in patients with an infarct, which is either the cause or the effect of severe disease.¹⁰ Respiratory depression aggravates the hypoxia in many such patients¹¹ and may increase the size of the infarct.

The common features associated with the respiratory depression in these patients were the prophylactic use of anti-emetic drugs (one case), intramuscular injection of an opiate (two cases), or both (three cases). Only one of the seven patients received only intravenous opiate. Case 6 had an obvious overdose (20 mg of heroin). Antiemetics aggravate respiratory depression,¹² and the irregular absorption from muscular sites is hazardous—if respiratory depression occurs after intravenous injection it will occur within 10 minutes and may be easily recognised and treated.¹³ I hesitate to think how many patients have died in the ambulance on the way to hospital of unsuspected hypo-ventilation rather than from their myocardial disease.

RECOMMENDATIONS

(1) Give elderly patients small doses—at the most 2.5 mg of heroin or 5 mg of morphine—only intravenously.¹⁴ The whole ampoule need not be given, especially not intramuscularly.

(2) Do not give antiemetics unless the patient is nauseous, as small doses of narcotics infrequently cause nausea in elderly patients.

(3) Watch closely for opiate toxicity, and reverse this with treatment with naloxone. Hypoventilation may recur because the half-life of naloxone is shorter than that of the opiates. If pain returns further smaller doses of the opiate may be given under close supervision.

(4) Catastrophic hypotension with bradycardia usually responds when the legs are raised. Atropine is seldom needed.

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Are laser rays effective treatment for diabetic retinitis?

Adequately controlled studies in the United States and Britain have shown that laser treatment and xenonarc photocoagulation are effective in the treatment of diabetic retinopathy.¹ Laser coagulation is applicable to both background retinopathy (maculopathy) and proliferative retinopathy with new vessel formation. The patient should recognise that the purpose of the treatment is prophylactic with the aim of preventing deterioration. In cases of macular oedema there may be a useful but moderate gain in visual acuity, but most patients will experience no improvement in sight. Fluorescein angiography is normally performed beforehand to delineate the defective retinal vessels to guide the laser therapist and may be repeated afterwards to show the effectivity of the treatment. Treatment is time consuming, but both eyes may be completely treated at a single session if the patient is robust. Both patient and clinician must recognise that a single-treatment session is only the beginning of the management of diabetic retinopathy, which will need repeated reassessment and treatment.—N PHELPS BROWN, consultant ophthalmologist, London.

¹ Blach RK, Hamilton AM. Science, therapy, and implementation. An assessment of diabetic retinopathy in 1980. *Trans Ophthalmol Soc UK* 1980;100:94-5.