associated with acromegaly, not only from the axillae but also from the forehead and limbs. It may be particularly useful in those patients who do not respond to bromocriptine.

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[1] Scholes, K T, *et al*, *British Medical Journal*, 1978, **2**, 84.
[2] Wass, J A H, *et al*, *British Medical Journal*, 1977, **1**, 875.
[3] Clayton, R N, *et al*, *Acta Endocrinologica*, 1978, **89**, 469.

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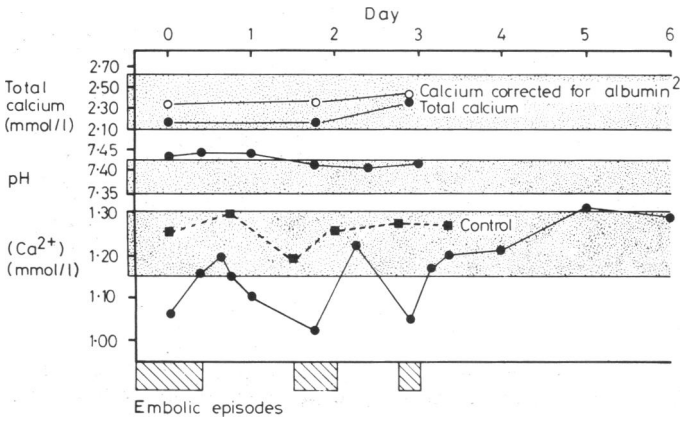
Ionised calcium in fat embolism

Hypocalcaemia has been reported in the fat embolism syndrome, but it is said to be non-specific.[1] We describe here a case where a directly measured low ionised calcium (Ca^{2+}) concentration alerted us to the diagnosis of fat embolism. Subsequent measurements of Ca^{2+} proved to be an accurate index of recurrent embolic episodes.

Case report

A 27-year-old man sustained a displaced fracture of the right tibia and fibula after a road-traffic accident. No other significant injury was sustained. The fracture was manipulated under general anaesthesia and the leg immobilised in full-leg plaster. Two days later the patient complained of sudden retrosternal chest pain radiating to the neck and arms. On examination he had a tachycardia of 120/min with normal blood pressure and respiratory rate of 20/min. An electrocardiogram showed T-wave inversion over the anterolateral leads. The measured Ca^{2+} was 1·06 mmol/l (4·24 mg/100 ml) (Orion SS-20, normal range 1·15-1·30 mmol/l (4·6-5·2 mg/100 ml)) with an arterial pH of 7·42. Fat embolism was considered as a possible cause of the episode of cardiac ischaemia and he was transferred to the intensive care unit. One hour later he became restless and dyspnoeic with a respiratory rate of 30/min. Auscultation showed coarse basal crepitations, and sputum stained positive for fat. Multiple petechial haemorrhages developed over the upper chest and his temperature rose to 37·8 C. Investigations showed: arterial Po_2 6·94 kPa (52 mm Hg), Pco_2 4·4 kPa (33 mm Hg), pH 7·43, forced expiratory volume in 1 second (FEV_1) 2 l/min, FEV: vital capacity 72%, haemoglobin 11·2 g/dl, platelets 160 · 10^9/l. Over the next three days, while the patient was maintained on oxygen alone, two further episodes of clinical deterioration occurred. Firstly, he developed new petechial haemorrhages and increasing dyspnoea and, secondly, he suffered an episode of restlessness and confusion. The figure details the changes in Ca^{2+}, pH, total calcium, and calcium corrected for albumin during this period. Control values relate to an age- and sex-matched patient confined to bed with a fractured 12th rib.



Fluctuations in ionised calcium over three-day period during which three separate clinical deteriorations occurred (hatched areas). Shaded areas indicate normal limits for ionised total calcium and pH.

Conversion: SI to traditional units—Calcium: 1 mmol/l ≈ 4 mg/100 ml.

Comment

The course of the embolism syndrome in this case was uncommon and differed from the usual clinical course of fat embolism. The classic clinical syndrome of respiratory insufficiency, progressive arterial hypoxaemia, disorientation and other cerebral effects, pyrexia, tachycardia, and petechial rash usually begins 12-72 hours after injury. In a recent study[2] hypocalcaemia was found in eight out of 100 patients with the clinical syndrome of fat embolism and the authors did not list this as of diagnostic significance. The mechanism of hypocalcaemia is not understood but may result from the binding of Ca^{2+} to free fatty acids said to be liberated by local lipolysis, possibly in the lungs. Raised serum lipase values have been reported in 40% of patients with fractures three to five days after trauma[3] but may also be non-specific. Fatty acid binding would affect the total calcium only if the fall in Ca^{2+} is substantial. Theoretically the Ca^{2+} as directly measured by the Orion SS-20 should be a much more sensitive index of calcium homoeostasis than the measured total calcium. In this patient the ionised calcium was low before other signs of fat embolism became apparent. Furthermore, the Ca^{2+} fell with each subsequent deterioration and seemed to correlate well with a recurrent clinical episode. Total calcium values estimated at the same time were within the normal range.

There is no single laboratory test which can be used to diagnose fat embolism. Those "simple" tests which are available are time consuming[4] and their results often do not correlate with the clinical severity of the syndrome.[2] The development of flow through specific ion electrode analysers such as the Orion SS-20 now allows accurate estimations of Ca^{2+}, while being easy to use and within the scope of most laboratories. Although we report only one case the Ca^{2+} (as directly measured) mirrored the clinical state of the patient and warrants further investigation by the centres of major trauma.

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[1] Gong, M, *Postgraduate Medicine*, 1977, **62**, 40.
[2] Gurd, A R, and Wilson, R I, *Journal of Bone and Joint Surgery*, 1974, **56B**, 408.
[3] Peltier, L F, Alder, F, and Lai, S P, *American Journal of Surgery*, 1960, **99**, 821.
[4] Lahri, B, and Zu Wallack, R, *Journal of Trauma*, 1977, **17**, 956.

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Severe poisoning with chlormethiazole

Chlormethiazole (Heminevrin) is used in treating alcohol withdrawal symptoms and as a hypnotic in the elderly. We report 16 cases of chlormethiazole poisoning.

Case reports

Thirteen patients were admitted on 16 occasions after overdoses of chlormethiazole. The clinical details are summarised in the table. Four had been prescribed chlormethiazole as a hypnotic and three had taken tablets belonging to relatives. The other six were alcoholics who had taken three to 12 Heminevrin tablets daily for periods varying from two months to six years, although most had continued to drink heavily. No patient was known to have cirrhosis but five had chronic bronchitis. Alcohol had been taken in at least six cases. Three patients had taken other drugs,