Fat Embolism and Cerebral Infarction after use of Methylmethacrylate Cement

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In view of the current interest in the cardiovascular effects of methylmethacrylate cement (Powell et al., 1970; Peebles et al., 1972) and its implication in the genesis of fat embolism (Hyland and Robins, 1970; Gresham et al., 1971), we report the case of a patient who failed to recover consciousness after Schier's arthroplasty in which methylmethacrylate bone cement was used. Both cerebral fat embolism and infarction within cerebral arterial boundary zones were found at necropsy.

Case Report

A 67-year-old woman who had suffered from rheumatoid arthritis for several years was admitted to hospital for total joint replacement of the left knee. Her preoperative general condition was good: pulse 74/minute, B.P. 135/80 mm Hg, E.S.R. 24 mm in the first hour. After routine premedication a Schier's arthroplasty using methylmethacrylate bone cement to secure the prosthesis was carried out. The operation, including the induction time, lasted one hour. No anaesthetic difficulties arose and there was no undue blood loss.

Two and a half hours after operation she had failed to regain consciousness. The blood pressure was 70/50 mm Hg but returned to the preoperative level within 48 hours. During the postoperative period measures were taken to correct a metabolic acidosis and a degree of hypoxaemia (Pao2 44 mm Hg, Paco2 21 mm Hg). In spite of this intervention the neurological state failed to improve and she remained unconscious with bilateral extensor plantar responses until she died on the fifth postoperative day. The possibility of systemic fat embolism was considered but there were no petechiae, fat lobules were not found in the urine, and there were no retinal emboli.

At necropsy, apart from oedema and partial collapse of the basal segments of each lung, there were no appreciable macroscopic abnormalities. Histological examination showed extensive pulmonary and visceral fat embolism.

The brain was fixed in 10% formal saline for three weeks before dissection. The cerebral hemispheres were cut into 1 cm slices in the coronal plane after transection of the midbrain. Large blocks of the cerebral and cerebellar hemispheres and the brain stem were embedded in celluloid, and sections cut at 30 μ were stained by the method of Nissl using cresyl violet, and by Weolke’s modification of Heidenhain’s method for myelin. Frozen sections from numerous representative areas of the brain were stained by oil red-O for fat. In both the cerebral and cerebellar hemispheres there were essentially wedge-shaped areas of established infarction affecting both cortex and white matter within the arterial boundary zones (Figs. 1 and 2). In addition frozen sections showed many fat emboli in the brain. There was no evidence of either extracranial or intracranial occlusive arterial disease.

Comment

Gresham et al. (1971) described an association between Thompson’s replacement arthroplasty using methylmethacrylate cement and a high incidence of fatal fat embolism in the immediate postoperative period, and suggested that fat embolism occurs more often than is recognized. Though the possibility of systemic fat embolism was considered in this case, evidence for it was not found in vivo. Pathological evidence, however, was readily obtained by microscopy.

FIG. 1—Left parietal region. Note infarct in boundary zone between anterior and middle cerebral arterial territories. The smaller ischaemic lesions are due to fat embolism. (Cresyl violet. × 1-8.)

FIG. 2—Distribution of arterial boundary zone infarcts (shaded). There is bilateral infarction between territories of anterior and middle cerebral arteries, between middle and posterior cerebral arteries, and between superior and posterior inferior cerebellar arteries. Arrows indicate pressure necroses at sites of tentorial herniation.
Erythropoietic Protoporphyruria: First Report in an Indian

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Erythropoietic protoporphyria, a recently recognized disorder of porphyrin metabolism, was first described by Magnus et al. in 1961. It is characterized by mild to moderate photosensitivity and an excess of protoporphyrins in the erythrocytes and the stools. The condition is alleged to be inherited as an autosomal dominant character (Schmid, 1966). A large number of cases have by now been reported from different parts of the world. To our knowledge, however, there has been no previous report of erythropoietic protoporphyria from India. In reporting such a case we also wish to draw attention to certain unusual features which were present.

Case Report

A 7-year-old Sikh boy, the product of a consanguinous marriage, presented with a history of recurrent asymptomatic vesiculobullous lesions on the arms, face, and uncovered portions of both legs since the age of 1 year. The lesions healed within two or three days, leaving atrophic and hyperpigmented spots. There was no history of preceding erythema, oedema, or any particular relation to exposure to sunlight. "Peeling-off" of the skin was reported to occur on minor mechanical trauma, though vesicular lesions would appear spontaneously on exposed parts. The urine was reported to be of normal colour. No other members of the family were reported as suffering from a similar condition.

On examination the most striking clinical features were hyperpigmented macular and atrophic hyperpigmented scarred lesions confined to the face, ears, hands, arms, and feet (Fig. 1). The fingers were stunted and showed thickening of the skin over the knuckles (Fig. 2). There was a moderately dense crop of lanugo on the upper lip and chin and on the forehead, where it covered almost the entire area from the eyebrows to the hairline. The forearms and legs were also covered by dense hair. The spleen and liver were not palpable and systemic examination did not show anything abnormal. The teeth, which were normal in colour, showed fluorescence under Wood's light.

The haemoglobin level was 10.8 g/100 ml and the packed cell volume 35%. A peripheral blood smear showed normal erythrocyte morphology with little anisocytosis. The total white cell count was 11,400/mm³ (polymorphs 46%, lymphocytes 52%, eosinophils 2%) and the reticulocyte count 0.1%. The serum proteins were 6.4 g/100 ml, serum cholesterol was 200 mg/100