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Defibrination syndrome in phlegmasia cerulea dolens

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PHLEGMASIA cerulea dolens is an uncommon but well established clinical entity (Stallworth *et al.*, 1965). It is characterized by massive venous occlusion in a limb with intense violaceous cyanosis, woody oedema, loss of arterial pulsations and sometimes gangrene (Annotation, *Brit. med. J.*, 1967). Incoagulability of the blood with hypofibrinogenaemia and thrombocytopenia has occasionally been described in this condition in those cases which are associated with an obvious primary pathology (Rosenberg & Zullo, 1958; Meek & Maurer, 1959; Fogarty *et al.*, 1963; Annotation, *Brit. med. J.*, 1967). A case is described of recurrent phlegmasia cerulea dolens with defibrination syndrome in an otherwise healthy 14-year-old mongol boy.

Case report

The patient was admitted on 17 July 1967 with a history of pleuritic pain in the right side of his chest for a few days, pain in the left groin and swelling of the whole of the left lower limb for 2 days. A diagnosis of deep vein thrombosis with pulmonary

infarction had been made by the attending doctor and he had been put on phenindione prior to admission.

On examination the whole left lower limb was swollen, violaceous and showed woody oedema. Arterial pulsations were absent in this limb apart from the femoral. Examination of the heart and abdomen showed no abnormality and rectal examination was negative. The chest showed signs of a small right-sided effusion. Treatment with phenindione was continued. Blood was sent for prothrombin estimation 36 hr after starting phenindione. Surprisingly, the prothrombin time was found to be greatly prolonged with no clot formation for over 2 min. A Schneider titre showed a plasma fibrinogen level of less than 50 mg/100 ml. After addition of fibrinogen to the plasma the prothrombin, and kaolin-cephalin times were still greatly prolonged, with a prothrombin time of 50 sec, suggesting that there were deficiencies of other clotting factors (Annotation, *Brit. med. J.*, 1965). These may, however, have been due to the phenindione. Whole

blood clot and fibrin plate lysis times were normal, excluding excess fibrinolytic activity. Other investigations showed a positive Heaf Test; Hb 12.3 g/100 ml; leucocytes 11,000/mm³; platelets 70,000/mm³; blood urea and electrolytes normal; bone marrow examination normal; IVP and straight X-ray of abdomen normal but chest X-ray confirmed the small right-sided effusion.

Surgical opinion was sought but he was thought to be unsuitable for surgery. Treatment was, therefore, started with heparin, commencing with 80,000 units daily by i.v. infusion, as this anti-coagulant is thought to be the drug of choice under these circumstances (Annotation, *Brit. med. J.*, 1967; Merskey *et al.*, 1967). This dosage was continued for 7 days followed by 60,000 units for 14 days and then 40,000 units daily for a further 14 days. During the initial stage of the heparin therapy when he was on 80,000 units daily the whole-blood clotting-time was maintained between 15 and 20 min. He responded slowly but steadily to this treatment and showed both clinical and haematological improvement. Within a week, the fibrinogen level rose to normal, the swelling started to subside and the absent arterial pulsations returned. After 4 weeks the left lower limb returned to normal. On 23 August 1967 (5 weeks after admission), despite the continuation of 40,000 units of heparin daily, an exactly similar episode occurred in the right lower extremity. In view of the time for which heparin had already been given he was started on phenindione and the heparin was discontinued. Within 48 hr a full effect of phenindione was established with a prothrombin efficiency of less than 10%. On 25 August 1967 gangrene developed in right great and second toes. Heparin was restarted by i.v. infusion at 80,000 units daily, continued at this dosage for 14 days and then reduced to 60,000 units daily. The affected limb showed steady improvement and there was no extension of the gangrene. Heparin was further reduced to 40,000 units daily and finally stopped after 5 weeks, being replaced by phenindione. Apart from some sloughing of the skin of the toes affected by gangrene, both lower limbs were now normal. With the second episode affecting the right side there was no recurrence of the defibrination or the thrombocytopenia. Before he was discharged from hospital on 17 October 1967, after a stay of 3 months, a check X-ray of his chest showed complete resolution of the right-sided pleural effusion. He has continued on phenindione.

Discussion

Uncomplicated phlegmasia cerulea dolens has been treated by anti-coagulants alone, decompression fasciotomy, thrombectomy followed by anti-coagulants (Annotation, *Brit. med. J.*, 1967) and

more recently by fibrinolytic agents (Fletcher *et al.*, 1965; Annotation, *Lancet*, 1968). Thrombectomy followed by anti-coagulants is probably the treatment of choice (Rosenberg & Zullo, 1958; Robles, Walske & Wilcox, 1966). In view of the presence of defibrination, management in this case was in general conservative. He was treated with heparin for a total period of 10 weeks as his response to this treatment appeared to be excellent while by contrast venous gangrene both developed and progressed while he was on phenindione. As regards the defibrination developed by this patient, it has been suggested that a better term for this condition might be coagulation consumption coagulopathy (Rodriguez-Erdman, 1965; Merskey *et al.*, 1967) indicating that in these circumstances at least, it may be due to utilization of fibrinogen in the thrombotic process, a view shared by Meek & Maurer (1959). It is interesting that despite the very low fibrinogen level the patient did not show any haemorrhagic manifestations, which in itself is unusual. More unusual still is the occurrence of this uncommon condition unassociated with any clinically recognizable primary pathology.

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