Post-transfusion purpura and multiple transfusions

Post-transfusion thrombocytopenic purpura (PTTP) is an acute, severe, and transient condition occurring in patients about one week after transfusion, presumably owing to a common soluble platelet antigen in the donor blood that stimulates formation of a complement-fixing isoantibody in the recipient. Antigen-antibody complexes are formed and become fixed to recipient platelets, which are then prematurely destroyed.

In 1961 Schulman¹ described two patients with the PTTP syndrome and identified a complement-fixing antibody to a heterologous platelet antigen in their serum which he named PIA¹. Other studies have shown that this antibody agglutinates platelets from 98% of normal people. Subsequently described patients have also lacked the PIA¹ antigen and had formed isoantibodies, while later reports² have implicated other antigens as well.

Twenty-one cases of PTTP have been reported, most in multiparous women,^{3,4} most of whom had no history of transfusion. We report the first case of PTTP developing in a patient known to have had multiple uneventful transfusions.

Case report

A 43-year-old woman, complaining of progressive fatigue, was admitted to another hospital on 30 June 1976. Her hematocrit value was 17%; white blood cell count $6.2 \times 10^9/l$; and platelet count $333 \times 10^9/l$. A bone marrow aspirate showed no stainable iron. On 2 July 1976 an infusion of cross-matched packed red blood cells was begun. After receiving 100 ml of the transfusion the patient developed chills and fever. The transfusion was discontinued, and she was treated with aspirin and steroids. On the next day she received two units of packed red blood cells without reaction, and iron was prescribed. On 12 July the patient noted mucous membrane bleeding and petechiae. The platelet count at that time was less than $10 \times 10^9/l$, and she was referred to the Naval Regional Medical Centre, San Diego.

Her medical history showed that she had had transfusions after four of six pregnancies. She denied a history of abnormal bleeding or easy bruisability. Physical examination showed gingival bleeding and a petechial rash. A bone marrow aspirate disclosed numerous megakaryocytes and absent iron stores. Prednisone was prescribed, but had no effect, and was discontinued gradually. After one week the platelet count rose. When seen as an outpatient on 27 September 1976 the patient had a platelet count of $310 \times 10^9/l$ and a hematocrit value of 42%.

Platelet studies—Acute and convalescent serum samples and platelets isolated after recovery were tested for antibodies using a technique in which ⁵¹Cr released from platelets in the presence of antibody and complement served as a measure of antibody activity⁵ in Dr Richard H Aster's Laboratory at the Milwaukee Blood Centre, Incorporated. An antibody was shown to react strongly against the platelets from each of four PIA¹-positive subjects but not against those of one PIA¹-negative donor. The patient's platelets lacked the PIA¹ antigen.

Comment

This patient's clinical course was benign and did not necessitate aggressive measures. Most efforts to accelerate recovery of platelet counts have been unsatisfactory in patients with this disorder. Steroids have had no effect. Exchange transfusions have been advocated in an effort to dilute the antibody present and consume it by combining it with transfused platelets.¹ Severe reactions to blood products caution against use of this treatment.³ Eisenberg and Abramson⁴ reported a prompt response to plasmapheresis in three patients.

Our patient's history is most unusual because she had received other transfusions without sequelae. Several possibilities may explain this unique feature. Firstly, a high concentration of platelet antigen in donor blood, and a poor antibody response in the recipient could result in an antigen excess and failure to form antigen-antibody complexes. Secondly, had noncomplement-fixing antibodies been formed after earlier transfusions, these might have blocked the complement-fixing activity of the anti-PIA¹ antibody. Less likely possibilities are that previous donors had lacked the PIA¹ antigen or that the patient had subclinical disease. This case serves to show that PTTP may occur in any patient lacking the PIA¹ antigen regardless of previous transfusions.

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Reversible hypertension and hyperreninaemia after accidental ureteric ligation

Hypertension after ureteric obstruction has been recognised for at least 40 years,¹ but the mechanism has not been fully defined. We describe here a patient in whom hypertension and increased concentrations of renin followed accidental ureteric ligation. Both were reversed after repair of the ureter.

Case report

A 37-year-old woman underwent caesarean section for prolonged labour (day 1). During her pregnancy the blood pressure and urine had been normal. Three days after the operation she developed puerperal psychosis, and while she was in a psychiatric hospital the blood pressure was found to be 220/120 mm Hg. On day 26 she was referred for investigation. She weighed 49.5 kg and the mean blood pressure was 171/107 mm Hg (lying) and 192/108 mm Hg (standing). Investigations showed a proteinuria of less than 0.1 g/l and a ⁵¹Cr-EDTA clearance of 74 ml/min. An excretory urogram showed a normal right kidney, but on the left the pelvis became visible only after 24 hours.

At cystoscopy on day 35 the bladder was normal. A left ascending ureterogram showed complete obstruction at the level of the pelvic brim. Renal venous blood was sampled on day 37 for plasma renin activity, which was measured by radioimmunoassay. Laparotomy was undertaken on day 38. The left ureter was isolated on the pelvic brim and was found to be distended. It was traced down to an area of dense fibrous scar tissue and there divided. The bladder was then mobilised on each side and brought up to the ureter on the left side using the "psoas hitch" technique.² The ureter was reimplanted into the bladder through an oblique tunnel in the vesical wall.

On day 63 (25 days after operation) the mean blood pressure was 159/113 mm Hg lying and 174/111 mm Hg standing. Renal venous renin was assayed again. The blood pressure responded to a low dose of sotalol hydrochloride. This drug was stopped after three months and hypertension did not recur. The patient had no urinary symptoms and a micturating cystourethrogram showed complete emptying of the bladder on micturition and no evidence of vesicoureteric reflux. The ⁵¹Cr-EDTA clearance one year after repair was 97 ml/min.

Comment

Despite 37 days of total obstruction, the left kidney responded normally with an increased renin output after 200 mg of diazoxide was given intravenously. The raised left renal venous renin concentration returned to normal after relief of the ureteric obstruction (see table). Although the hyperreninaemia was corrected, the hypertension persisted and was moderately severe.

A similar patient has been reported in whom hypertension and raised peripheral venous renin were found three months after ureteric ligation during an emergency hysterectomy.³ After nephrectomy the

Renal venous renin concentrations before and after 200 mg of intravenous diazoxide, before and 25 days after repair of the ligated ureter. Renin expressed as ng/ml/min.

	Obstructed ureter		After obstruction	
	Before diazoxide	After diazoxide	Before diazoxide	After diazoxide
Right renal venous renin ..	2.1	5.0	0.9	1.1
Left renal venous renin ..	4.7	10.6	0.9	1.0
Ratio of left: right ..	2.23	2.12	1.0	0.9

hypertension and raised renin concentration fell to normal in four days. This rapid return to normal of the blood pressure and renin is in contrast to the course in our patient, who remained hypertensive despite a shorter period of ureteric obstruction. Perhaps short-lasting renal disturbance in our patient was able to maintain the hypertension independent of the renin-angiotensin axis by failing to remove a naturally occurring pressor substance. Alternatively, the raised blood pressure may have been mediated by a resetting of the peripheral resistance.

Accidental ureteric ligation occurs infrequently, but it represents a curable cause of hypertension and may give some insight into hypertensive mechanisms other than those immediately mediated by the renin-angiotensin system.

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Ischaemic colitis and drug abuse

The term ischaemic colitis embraces a wide spectrum of ischaemic damage to the colon ranging from mucosal necrosis, which is a reversible lesion, to full thickness infarction of the bowel wall. The disorder characteristically occurs in elderly patients with pre-existing chronic cardiovascular disease and is not associated with occlusion of the mesenteric vessels.¹ We describe a healthy young man who developed ischaemic colitis following an intravenous injection of Diconal (dipipanone hydrochloride and cyclizine hydrochloride).

Case report

A 25-year-old man was admitted as a surgical emergency with abdominal pain. For several years he had used a wide variety of drugs but was not addicted to any of them. The evening before his admission he consumed six pints (3 litres) of beer, and then injected himself intravenously with three Diconal tablets dissolved in tap water. He promptly fell asleep and four hours later awoke, vomited, and continued to retch for a further hour. He then developed central abdominal pain, which steadily increased in intensity and precipitated his admission. On examination, 10 hours after the injection of Diconal, he was in considerable pain, sweaty and pale, with a blood pressure of 100/60 and a pulse rate of 108/min. His temperature was normal. There was generalised tenderness and guarding over the abdomen with maximal tenderness in the right iliac fossa. Investigations showed a moderate leucocytosis and there were fluid levels on the straight abdominal x-ray films.

At laparotomy the caecum was gangrenous, though not perforated, and there was oedema and patchy infarction of the ascending colon and hepatic flexure. The related mesenteric vessels were pulsating as far as the bowel

Right hemicolectomy specimen showing haemorrhagic necrosis of the mucosa with submucosal oedema (arrow) and gangrene of the caecum.

wall. A right hemicolectomy was performed, and the transverse colon was brought out as a mucous fistula with the formation of a proximal ileostomy. Blood cultures were taken and the patient was started on intravenous gentamicin and lincomycin. Continuity of the bowel was restored about three weeks later after an uneventful postoperative recovery, and the patient was discharged after a further 10 days.

Pathological examination of the right hemicolectomy specimen (figure) showed haemorrhage and necrosis of the colonic mucosa with definite submucosal oedema. The caecum was paper thin and gangrenous. The process extended from the terminal 3 cm of ileum to the hepatic flexure and was most definite along the mesenteric border. Microscopically, full thickness infarction of the caecum was confirmed, and elsewhere there was haemorrhagic necrosis of the mucosa with appreciable submucosal congestion and oedema together with mild acute inflammation. An occasional thrombus was present in small submucosal veins but the mesenteric vessels were otherwise normal.

Discussion

The macroscopic and microscopic appearances of the resected bowel are characteristic of ischaemic colitis associated with non-occlusive mesenteric ischaemia.¹ This type of ischaemic colitis usually occurs in elderly patients with organic heart disease and is precipitated by a hypotensive episode. We can find three reports of intestinal ischaemia occurring in healthy young adults, all after hypotension.²⁻⁵ In each case hypotension was due to haemorrhage after severe trauma and in two of the cases the small intestine was affected.^{3,4} The distribution and nature of the colonic lesion in the other case⁵ were identical to our case. Although the patient we describe was not hypotensive when seen, conceivably hypotension could have occurred earlier when he was asleep. Intravenous injection of Diconal, each tablet of which contains 10 mg of dipipanone hydrochloride and 30 mg of cyclizine hydrochloride, causes hypotension² and this effect may be potentiated by alcohol. Intestinal ischaemia is clearly a very rare complication of hypotension in otherwise healthy young adults. Conceivably colonic distension, after heavy beer consumption, could have been a pre-disposing factor in this patient since raised intraluminal pressure of the intestine causes decreased intestinal blood flow.¹

Non-occlusive intestinal ischaemia should be considered in patients who have abdominal pain after a hypotensive episode.

We are grateful to Mr F P McGinn for permission to present this case.

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