Rupture of the bladder without injury to the pelvis is largely restricted to adults. The distended bladder of the alcoholic, late at night, is perhaps the most frequent example seen, when relatively minor trauma is sufficient to disrupt the bladder wall, usually intraperitoneally. Extraperitoneal rupture on the other hand is almost invariably associated with fracture of the pelvis. In most published series the majority of patients are over 40 years of age. In the young it is uncommon and in small children rare. Campbell (1929) published a series of 55 cases in which only three were under ten years old. Bacon (1943), analyzing 147 cases, could find only three under ten, the youngest being five. The youngest recorded was by Brooks (1946) of a child aged three and a half months. Hupp (1925) had one case of two and a half years old and three others of three years old. The following case is therefore thought to be of interest.

A boy, aged four and a half, was running up some stone stairs when he slipped and fell down a distance of some eight to ten steps. He appeared to fall on his back, and when his father picked him up he vomited and pointed to the abdomen as the site of pain. He was put to bed and went to sleep. Three hours later he woke up and again cried with pain. He tried to pass water but could not. He was then brought to hospital. When first seen he did not appear shocked. His pulse rate was 108, of good volume, and his temperature was normal.

He indicated that his abdomen was painful and although it was slightly tender all over to palpation there was no rigidity. Bruising was evident in both loins and across the back. A drop of blood was seen at the tip of the penis.

It was first thought that he had fractured the pelvis and ruptured the urethra, but an X-ray showed no bone injury. A soft rubber catheter passed easily into the bladder when 6 oz. of smoky urine were obtained. This, in conjunction with bruising of the back and loins, supported a diagnosis of bruising of the kidneys. However he passed no more urine and six hours later his abdominal pain had increased. Distension and shifting dullness were evident. It was then realized that he had ruptured his bladder.

He was prepared promptly for operation but just before this a soft rubber catheter was passed and 8 oz. of sodium iodide injected. Less than 2 oz. of the fluid were recovered. An X-ray showed the dye lying outside a half-collapsed bladder. The abdomen was explored through a median sub-umbilical incision and an intraperitoneal tear of the posterior aspect of the dome of the bladder found. It was 1½ in. long. Urine in the abdominal cavity was drained and mopped out. The bladder was repaired and the overlying peritoneum closed. A self-retaining suprapubic catheter was put in to drain the bladder. This was removed on the fifth day and he then passed urine normally. He was given a full course of penicillin and had singularly little post-operative upset, the only untoward occurrence being a partial collapse of the right middle lobe on the first day after the operation. This re-expanded rapidly with breathing exercises.

Comment

The pitfalls in diagnosing intraperitoneal rupture of the bladder have frequently been stressed and, as in this case, it can often be missed for a longer or shorter period until signs become unequivocal. The reasons for the delay in diagnosis in this case were (1) The extensive bruising of the back which indicated a point of impact other than the abdominal wall; (2) the successful catheterization; and (3) the age of the child. Sometimes a catheter may go through a tear and drain freely from the abdominal cavity. In one case recorded nearly 7 l. were withdrawn in this way; but a quantity of 6 oz., so easily obtained, appeared compatible with an intact bladder, and being smoky without any great amount of fresh blood supported a diagnosis of bleeding from one or both
kidneys. The rupture itself occurred classically at the posterior aspect of the dome where the bladder wall is weakest due to the divergence of muscular fibres in this area. It was surprising that the child showed so little signs of shock but it has been often pointed out that in this type of injury such a thing is not unusual and shock only becomes marked several hours after the accident. It is this which is responsible for the delay in getting the patients to hospital, and once there, in instituting active steps to close the bladder quickly.

Our patient made a smooth recovery without developing infection of the peritoneal cavity despite the fact that some 14 hours elapsed before operation. Intravenous pyelography has been advocated as an aid to diagnosis in doubtful cases instead of instilling a radio-opaque substance into the bladder, which by some is alleged to be dangerous. However, provided all is in readiness for immediate operation it would appear to be without danger. Bacon (1943), in fact, goes so far as to say that cystography is the most significant single diagnostic procedure.

Since Walther first closed a ruptured bladder successfully in 1859, the accident has always carried a high death rate. The mortality figures for uncomplicated intraperitoneal rupture are variously given as 10 to 12 per cent. if operation is delayed 12 hours, rising steeply to 60 per cent. if 24 hours elapse before treatment. Weyrauch and Peterfy (1940) give an overall figure of 50 per cent., and Bacon (1943) finds a total mortality of 44.2 per cent. and a surgical mortality of 36.5 per cent. The majority of these statistics, of course, refer to patients treated before the introduction of chemotherapy.

The rarity of this accident in children is presumably allied to the rarity of very distended bladders in this age group. The organ has not yet been cortically trained to a high standard of social security, and is emptied regularly before intravesical tension rises to any great height.

I wish to thank Mr. David Levi for permission to publish this case.

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