Spontaneous Extravasation of Contrast Medium Associated with Acute Renal Colic

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EXTRAVASATION OF contrast medium during intravenous urography in patients with acute renal colic is rare as pointed out by Ford in 1967. In the past few years this phenomenon is becoming increasingly common (Edwards 1969) and it is the purpose of this paper to report three cases which demonstrated very typical appearances. Failure to recognise these changes may unnecessarily lead to further investigations.

Extravasation of contrast in or about the kidney is well recognised in renal trauma, retrograde pyelography in patients who has had previous surgery on the kidneys and in some with tight abdominal compression during urography. These conditions have been ruled out as the obstructing calculus was demonstrated in all our cases.

Case I

R. J., a 53-year-old man presented with acute pain in the left loin characteristic of renal colic for 16 hours. He had no previous history of such pain. On examination extreme tenderness in the left loin was elicited. The blood pressure was normal with no history of haematuria or dysuria. An intravenous pyelogram done soon after admission showed extravasation of opaque material from almost all the calyces of the left kidney (Figs. 1A & 1B). The kidney was enlarged and the calyces were moderately dilated. The opaque material in the renal sinus surrounded the collecting system and tracked down along the ureter. A delayed radiograph showed a dilated left ureter with obstruction at the vesicoureteric junction. The calculus was passed out on the next day of admission and a repeat pyelogram done showed normal calyceal pattern of left kidney (Fig. 1C).

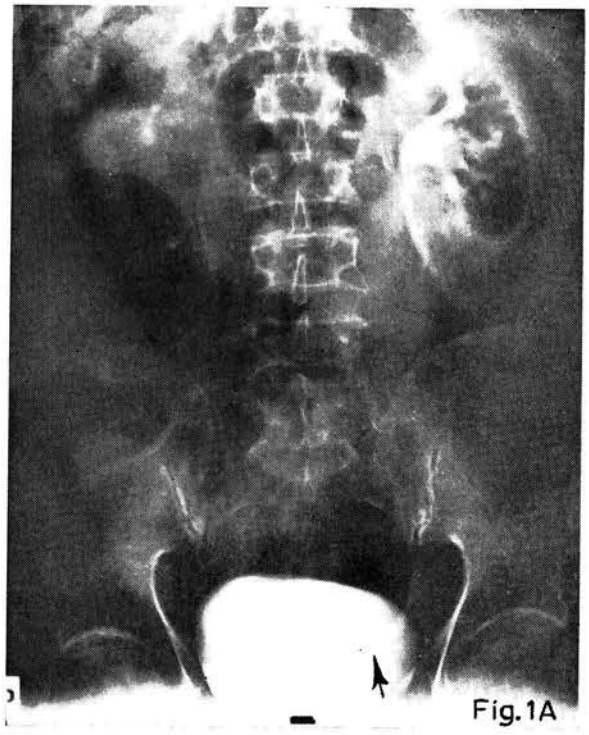

Figure 1A

Shows extravasation of opaque medium from almost all the calyces and the contrast is seen tracking down the pelvis and the ureter. Arrow shows the dilated ureter with obstruction at the vesico-ureteric junction.

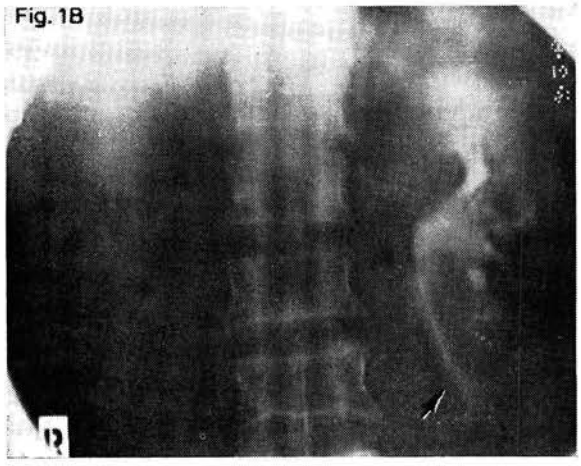

Figure 1B
Tomogram of the same patient shows very clearly the opaque material around the calyces and in the renal sinus. Arrow points to the contrast along the ureter. The pelvis of the left kidney is dilated as compared to the right.

Figure 1C
Normal calyceal pattern after the stone was passed out.

Case II

E. C., a 48-year-old man, was admitted with a 18 hours history of pain in the left loin which was radiating to the front of the abdomen. There was nausea and vomiting together with frequency of micturition. No haematuria or dysuria was experienced. No past history of such pain was obtainable. An intravenous pyelogram was done on the same day and it showed slight hydronephrotic changes of the calyces with extravasation in the renal sinus from all the calyces of the left kidney (Fig. 2A). The opaque medium was diffusely distributed. A ureteric stone was demonstrated at the vesicoureteric junction. A repeat intravenous pyelogram after the stone was passed out showed a normal calyceal pattern. Tomograms of the left kidney (Fig. 2B) were done during the second examination and it showed an increase in translucency of the renal sinus suggesting the presence of excess fat.

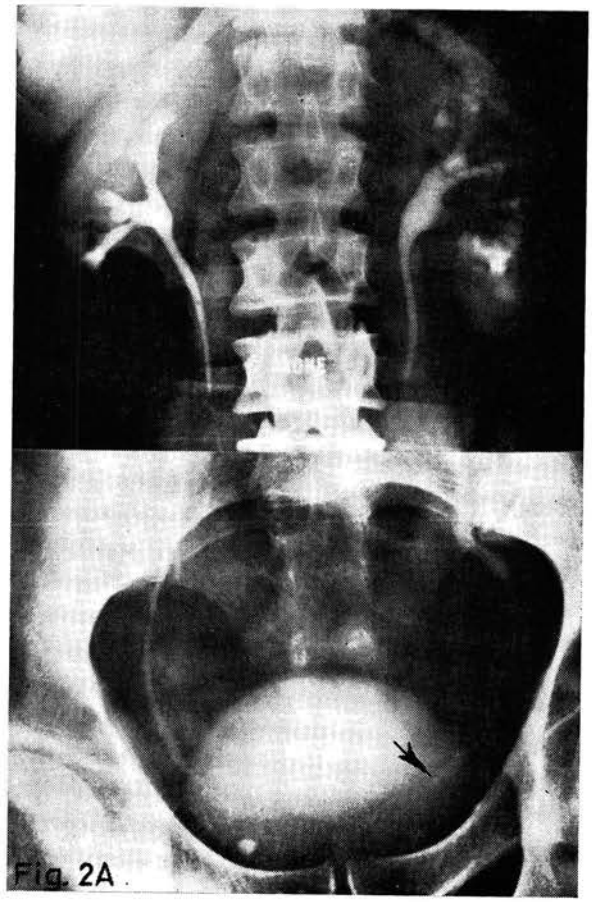

Figure 2A
Shows contrast medium along all the calyces and in the renal sinus. The ureter is dilated and the arrow points to the calculus at the vesicoureteric junction.

Case III

L. W., a 64-year-old male, was admitted as an emergency with severe left loin pain and vomiting. Three years prior to admission he had an operation of the right kidney for renal calculi. On examination his blood pressure was 180/110 mm. Hg., and had marked tenderness in the left loin. An intravenous pyelogram was done and this showed extravasation

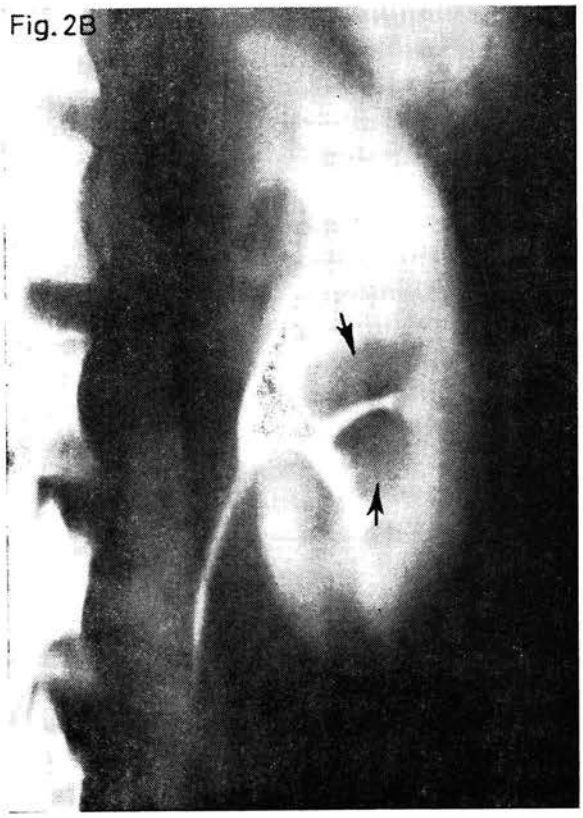

Figure 2B

Tomogram during intravenous pyelography of the same patient as in Fig. 2A after the stone was passed out. Normal calyceal pattern, but there is increase in translucency in the peripelvic area (arrow) suggesting excess fat.

of opaque medium into the left kidney substance and along the upper end of the left ureter (Fig. 3). The left ureter was dilated as compared to the right and a calculus was lodged at the vesicoureteric junction. A repeat pyelogram after the stone was passed showed normal appearances.

Discussion

The recognition of extravasation as a benign peripelvic phenomenon due to acute renal colic on urography is of great clinical significance. Failure to understand this may lead to unnecessary further investigations. The radiological features are both characteristic and diagnositic. However, radiographic appearances of medullary sponge kidney, cavitating tuberculosis and pyelonephritis should be considered in the differential diagnosis. In our series an obstructing calculus was always demonstrated in all three cases and excretory pyelograms done after the stone was passed showed normal renal appearances.

The mechanism of extravasation is not very clearly understood. Rabinotwitz (1966) relates it to the rapid rise in the intrapelvic pressure associated with ureteral obstruction. This appears to be the cause in our series as the calculus was always lodged at the vesicoureteric junction with proximal dilation of the ureter and pelvis and moderately dilated calyces. Olsson (1953) on his fourteen cases pointed out that the extravasation of opaque medium takes place through a tear at the junction of the fornix and the renal capsule. In all our three cases there was acute colicky pain and the calculus was demonstrated at the vesicoureteric junction. Due to the continuous back pressure distension of the ureter, pelvis and the calyces was seen. The kidneys were slightly enlarged and in one of our cases (Fig. 2B) tomograms revealed a translucency in the peripelvic area suggesting the presence of excess fat. We would like to postulate here, that the presence of excess fat may be a factor that allows more room for distension of the calyces. This in turn, due to increasing back pressure produce rupture of the fornices giving rise to extravasation.

Various types of extravasation of contrast medium are recognised. The one associated with

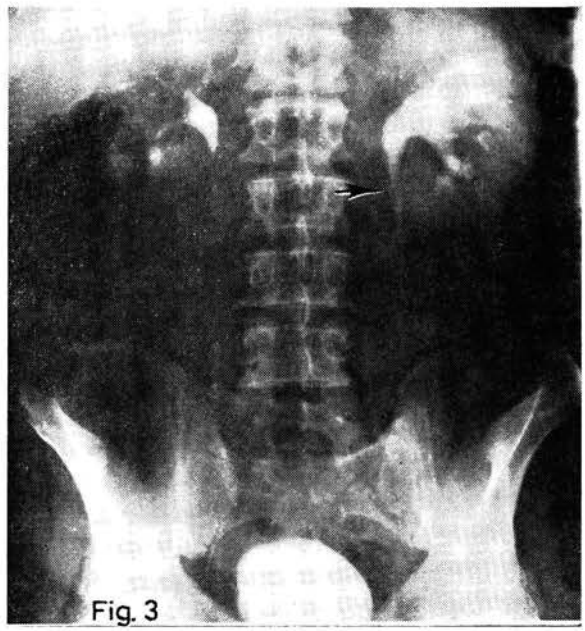

Figure 3

Shows extravasation in the renal sinus and along the left ureter (arrow). The ureter and pelvis are enlarged as compared to the right side.

renal colic is essentially a pyelosinous extravasation and the others like pyelo-lymphatic, pyelovenous and pyelo-interstitial are more extreme forms of pyelo-sinous extravasation (Edwards 1969). The pyelo-tubular extravasation is usually seen in retrograde pyelography and in some cases with tight abdominal compression during a routine intravenous pyelogram.

Summary

Three cases of acute renal colic giving rise to extravasation of radio-opaque medium during intravenous urography are discussed. The extravasation refers to the presence of opaque medium outside the pelvi-calyceal system in the renal sinus and may track down the peri-pelvic region on to the psoas muscle. This is essentially a benign complication and it is important to recognise it. Various explanations for the extravasation are reviewed and the one given by Rabinotwitz (1966) appears to be the most logical. He feels that ureteral obstruction gives rise to increase in pressure in the pelvis of the kidney and this in turn produces rupture of the fornices. The radio-opaque medium then escapes through this tear giving typical radiological appearances.

In one of our cases it is felt that the presence of excess fat could be a factor that allows more room for distention of the calyces due to back pressure and thence produce a tear in the fornices.

Acknowledgements

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