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Hydatid Disease of the Kidney

Report of 12 Cases

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Introduction

Renal hydatid cyst is an uncommon finding even in countries where echinococcus disease is prevalent.

Lee-Brown and Cardon Graig[1] have reported 16 cases of renal hydatid from Sidney. In Canada and U.S.A. less than 50 cases had been reported[7] until 1966.[7] In Tehran we have observed 12 cases of renal hydatid in the last 10 years. The reported incidence of involvement in kidneys has been 2.06 % by Vegas and Cranwell from Argentina,[23] 2.5 % from the Mayo-Clinic,[11] 2 % by Graham,[11] and 2.2 % in our own series.

There are 2 types of echinococcus: E. multilocularis and E. granulosus, the la ter being more common. Pytel has found only one case of E.m. in his report of 14 cases of renal hydatids in 1959 from Moscow, [12-13] ; the rarity of renal involvement is due to the difficulty that the parasitic embryo has in reaching the kidney.[14] Epidemiology and the ways of infestation are beyond the scope of this paper.

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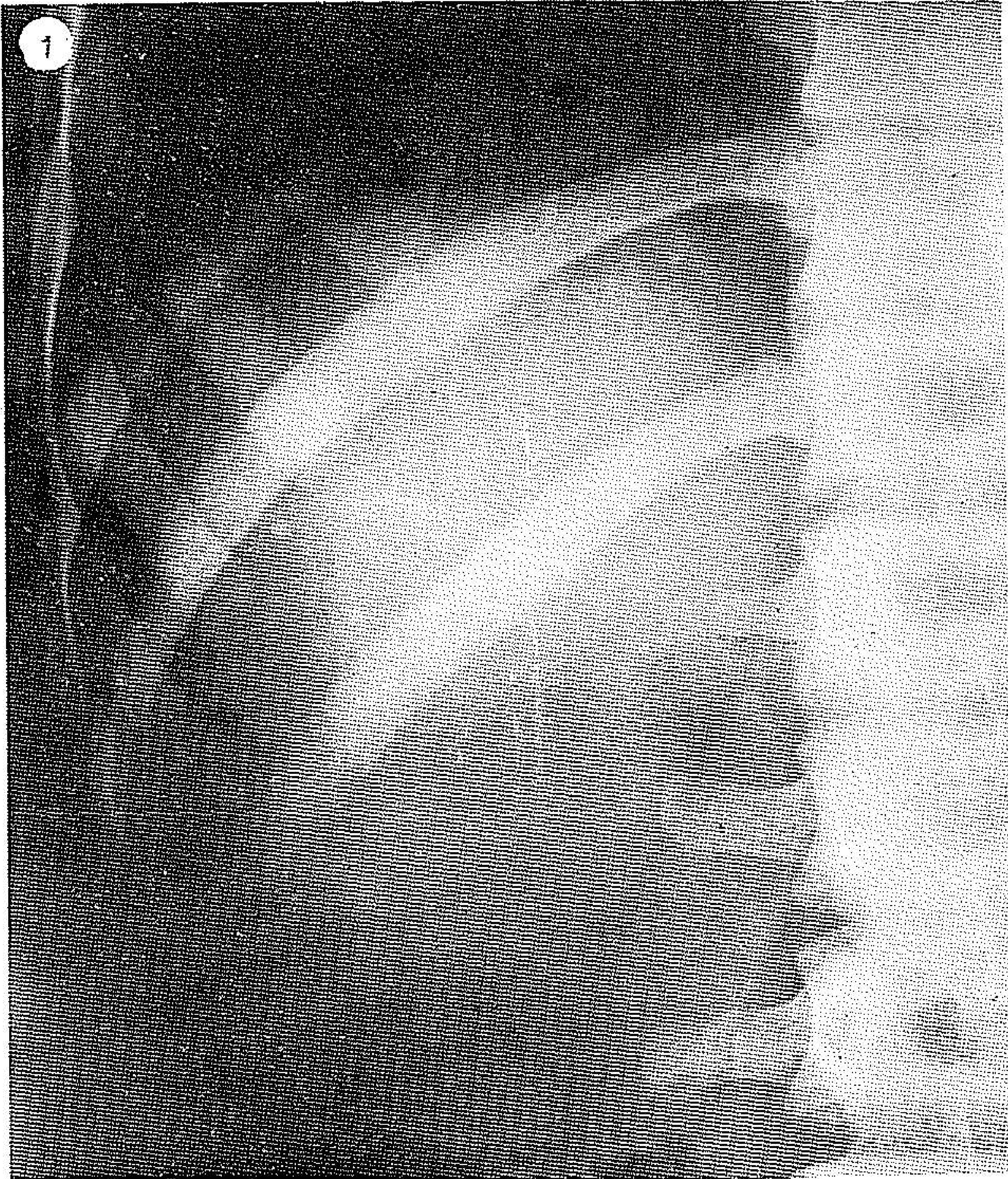


Fig. 1. Adventitial dense line around the hydatid cyst.

The disease is more common in the younger age group but may be found at any age. The left kidney is involved more frequently. The renal hydatid may be primary or secondary. Primary hydatid disease of the kidney is usually unilateral, more often in the lower pole and especially in the cortical portion. These cysts are usually singular but multiple cysts have also been reported. We have not seen bilateral hydatid cyst but Deve[5]

has reported bilateral renal involvement; we believe that this is secondary hydatidosis.

The cysts develop very slowly in the outer layer or adventitia with characteristic laminated membrane. The innermost layer or germinative membrane gives rise to the follicular elements with scolices inside them. The outer layer of the cyst is composed of dense, heavily vascularised, connective tissue, which may be seen as a fine curvilinear dense shadow on the plain x-ray film. This we believe is the pathognomonic finding for the hydatid cyst (Fig.1).

If the cyst wall becomes calcified circumferential or irregularly scattered

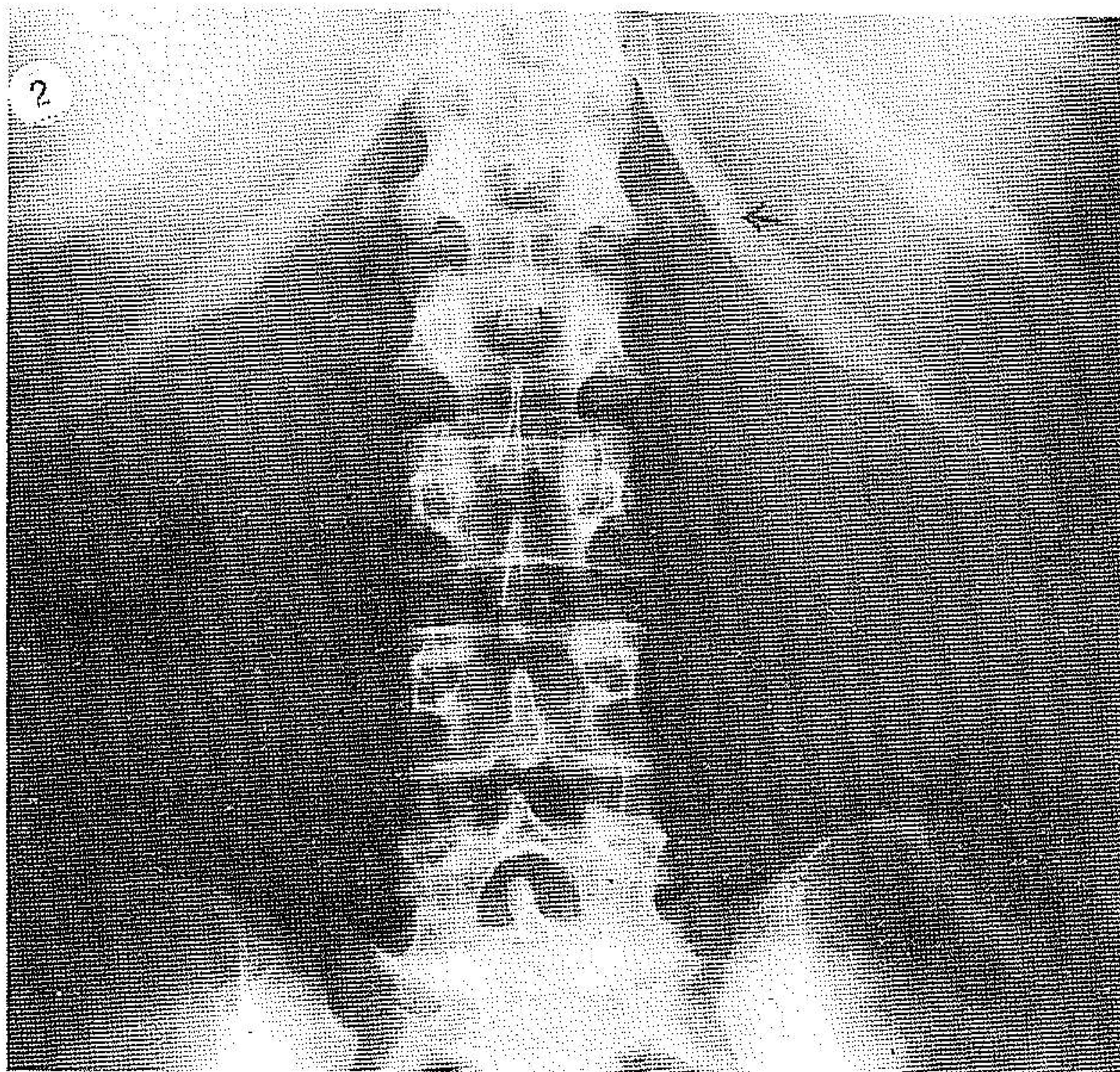


Fig. 2. Curvilinear calcification on plain film due to a hydatid cyst of kidney. (Case 4).

curvilinear calcifications are visible on the plain x-ray film (Fig.2 case 4). If the adventitia is absorbed, the laminated membrane and calyceal epithelium come into apposition without rupture of the cyst; this is called a pseudo-closed cyst.(16,19)

The exposed membrane commonly ruptures into a calyx but rarely does the cyst completely empty its contents. Usually some fluid is lost and elements such as the membrane, daughter cysts, scolices, hooklets and gelatinous substance are discharged in the urine. The patient may suffer from attacks of colic or urinary retention. Implantation of daughter cysts in a calyx, pelvis and ureter may produce new cysts. Rupture of the cyst may lead to infection and eventually to chronic pyelonephritis.

Clinical Findings

Although infestation may occur in childhood, the patient may remain asymptomatic until adult life.(9)Sometimes the patient discovers a large mass in his flank or complains of a heavy sensation. Cysts may produce urinary symptoms or may be asymptomatic and discovered as an incidental finding.

Pseudo-closed cysts often cause intermittent colicky pains often associated with hematuria.

In the open cysts the passing of hydatid debris may cause colic or urinary retention. In these cases, the diagnosis can be made by finding grape skin-like pieces of membrane on urinanalysis.(4,7,10,12,17) The opening may close and remain closed for months or years.

Laboratory Findings

The intradermal (Casoni) and complement fixation (Ghedini-Weinberg) tests do not have much diagnostic value since they are often negative in primary hydatidosis,(15)however positive tests are of diagnostic value. Eosinophilia is not always present and has been reported in only 40 % of cases. In any case in the countries where parasitic diseases are common this is not a valuable diagnostic finding.

Radiologic Findings

We consider x-ray findings under the following headings:

1 — *The Closed Cyst:* Owing to the presence of the cyst there is enlargment of the affected kidney. When the cyst is very large we may see its regular round or ovoid outline as a halo, due to the dense adventitia and tissue reaction around the cyst.

We have seen curvilinear calcification in 65 % of the cases, whereas its incidence in the literature has been reported as only as high as 20-25 %.[2-22]

Pyelogram: I.V.P. is essential for exact localisation of the cyst and kidney function. The involved kidney may not have any function because of considerable tissue destruction, obstruction of the calyceal system or ureteral obstruction may be due to extrinsic pressure. If the kidney is visualized depending on the size and location of the cyst the following findings are observed:

Small cysts may not show any distortion of renal or calyceal structure. Large cysts cause distortion and stretching of the adjacent calyces around the convexity of the cyst that will produce a "Claw or spider-leg" type of deformity in the pyelogram (Fig.3, case 1). A cyst in the lower or upper pole of the kidney or on the renal surface will produce different findings by the same mechanism (displacement and distortion of adjacent calyces). Obliteration of the calyces and calyceal ectasia may be followed by infection. A cyst in the upper pole will be embedded in the renal paranchyma and by pushing the calyces and pelvis downwards cause distortion of the proximal end of the ureter. This type of cyst has been referred to as the "Sit" type of deformity[8] (Fig.4, case 2).

The cyst in the lower pole will push the calyces and pelvis upwards and the ureter towards the midline (Fig.5, case 3). Cysts in the anterior or posterior aspect of the kidney will push the calyces and pelvis towards the hilar region and make a crescent-shape stratified shadow (Fig.6, case 4 and Fig.12, case 10). Cysts may occasionally grow towards the periphery with-

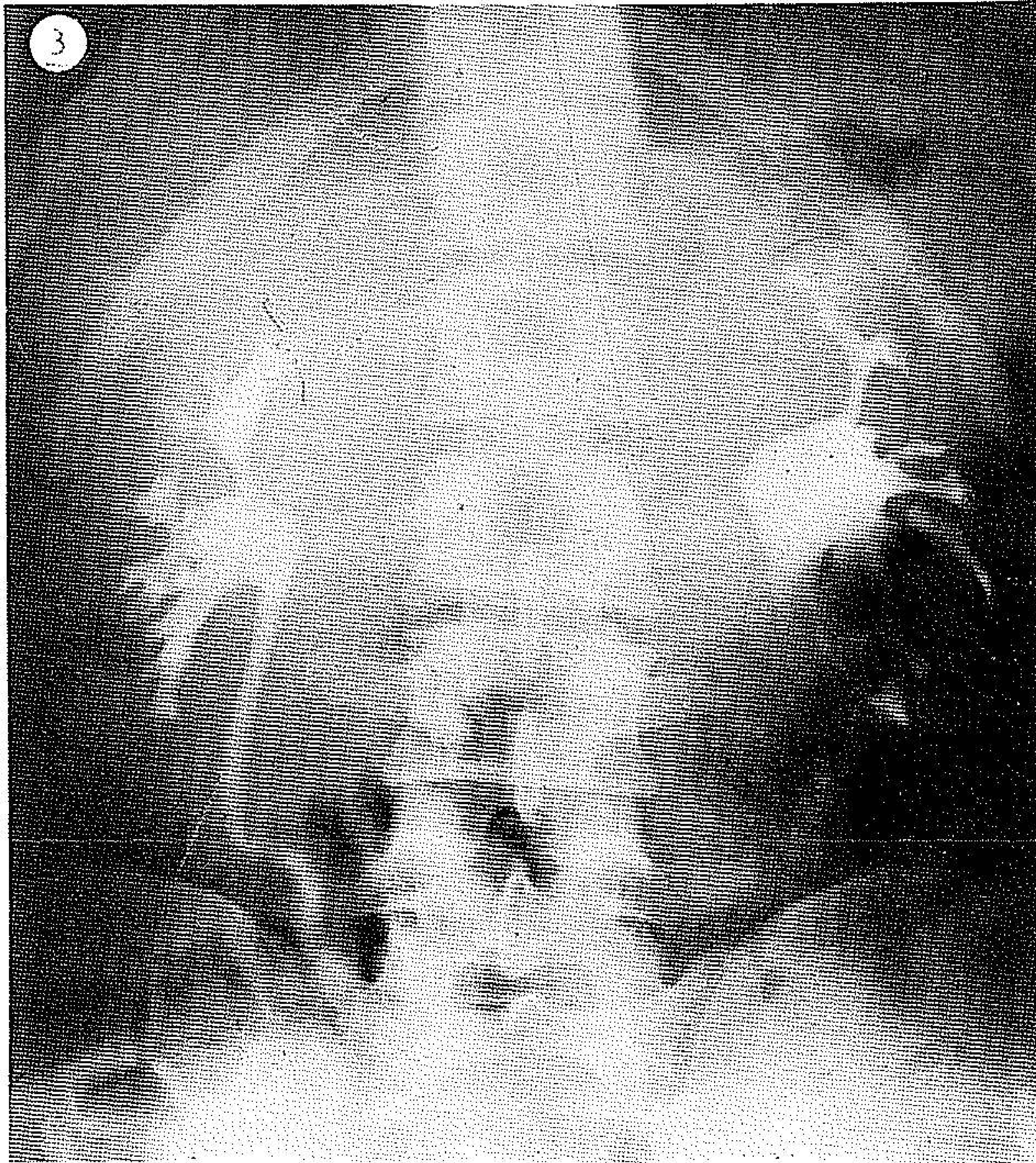


Fig. 3. Case 1. Pyelogram demonstrating claw deformity of calyces with curvilinear calcification in the wall of the cyst wall.

out causing any compression or destruction in renal tissue similar to subcapsular cyst.[15] Resection of the cyst in this condition will maintain normal appearance of the calyces (Fig.7, case 5).

On retrograde pyelography which should be done when there is functional impairment of the kidney, the x-ray signs are the same but clearer. The contrast medium should be injected very gently in order to avoid rupture

of the cyst. The calyces and pelvis are compressed and appear small, whereas the actual kidney size is large.

Pneumoretroperitoneum: This procedure is very helpful in doubtful cases (Fig.8, case 6).

Renal Arteriography: Renal arteriography demonstrates displacement stretching of branches of renal arteries and lack of vascularity corresponding to the renal mass (Fig.9, case 7). The filling defects may also be demonstrated by nephrography (Fig.10, case 8) and nephrotomography.

2 — *The Pseudo-Closed Cyst:* As mentioned above, absorbtion of adventitia and retraction of the laminated membrane will produce a crescen-

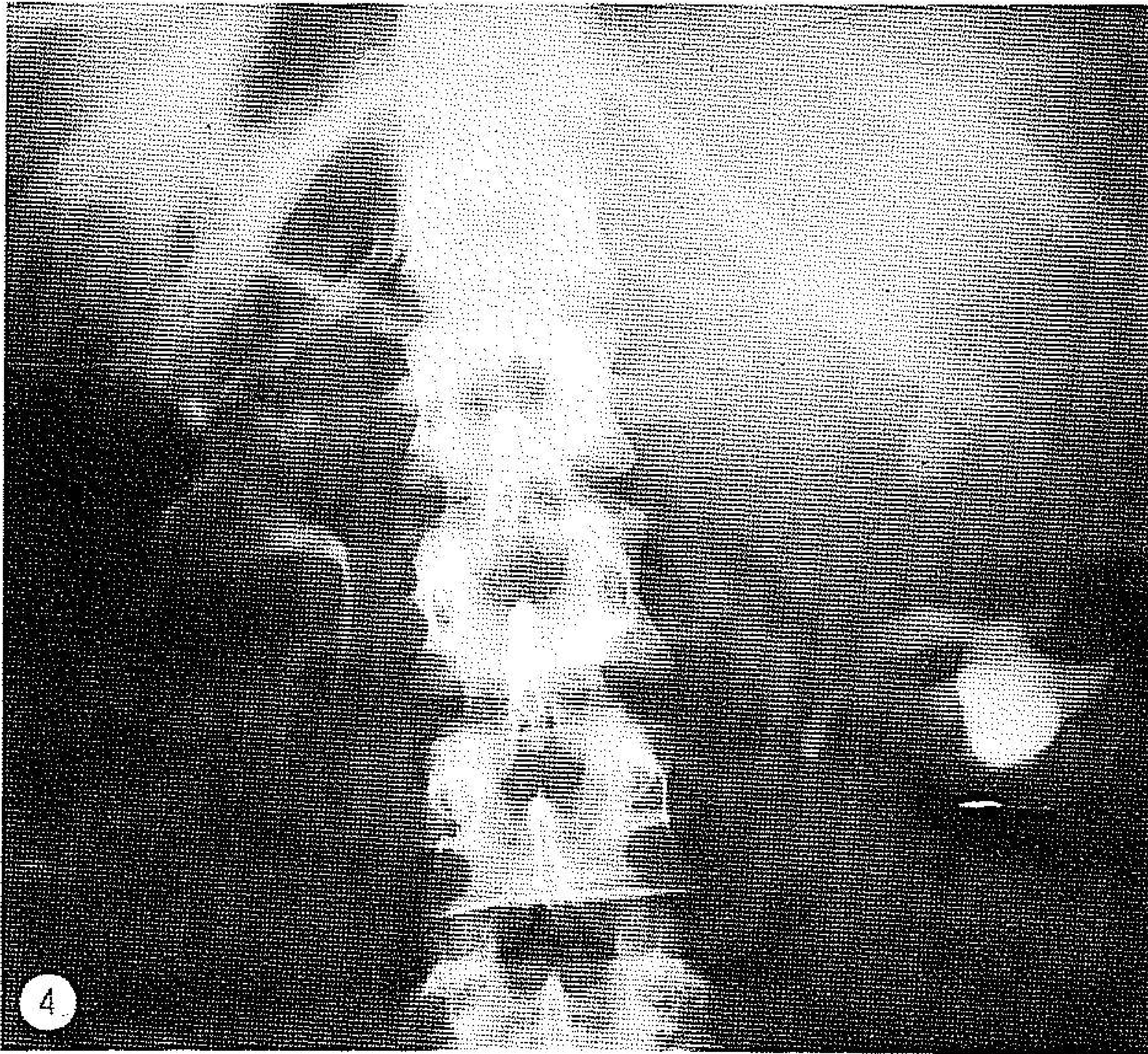


Fig. 4. Case 2. Intraveneous pyelogram showing "Sit" type deformity of calyceal system in hydatid cyst of the upper pole of left kidney.

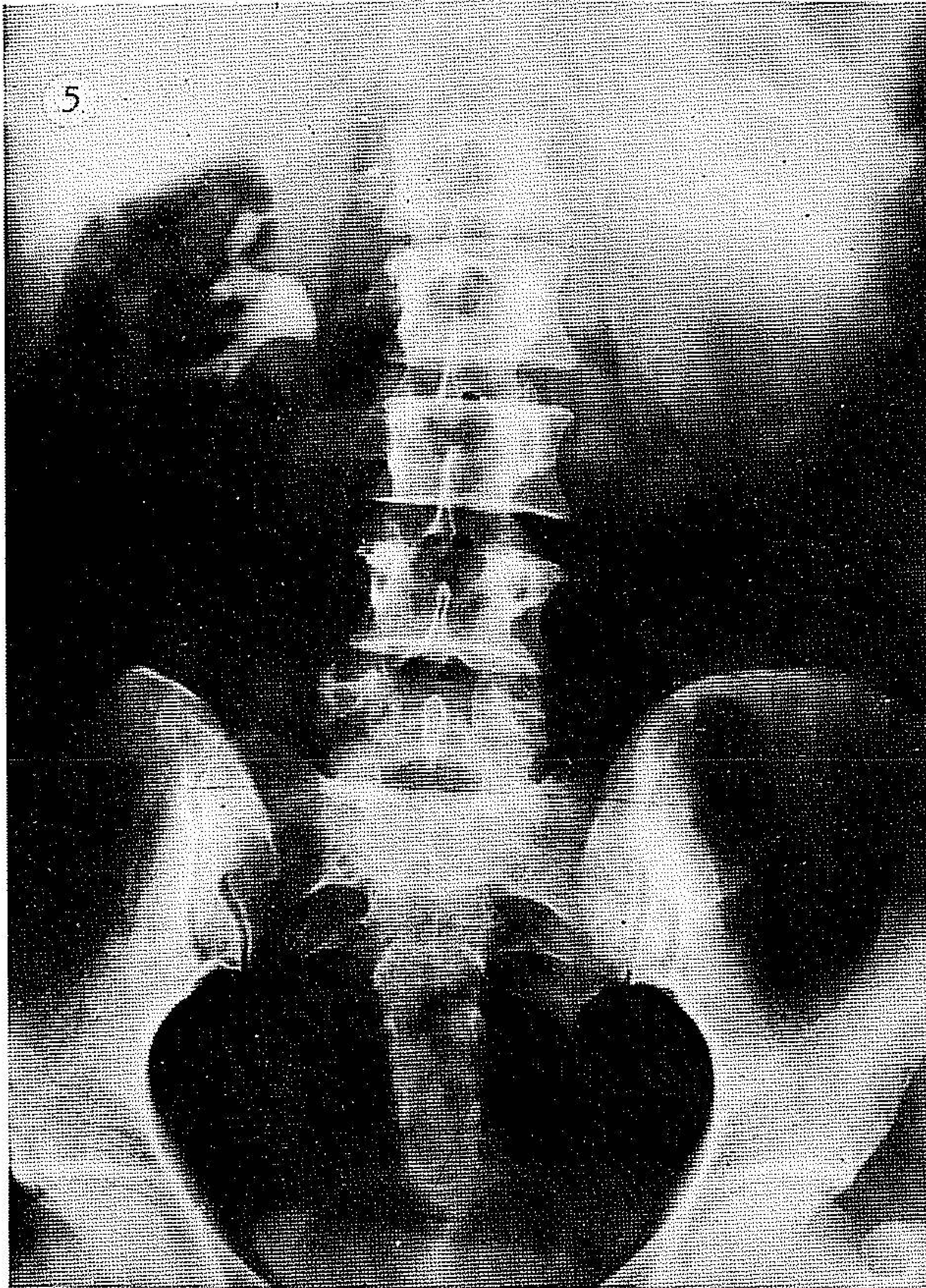


Fig. 5. Case 3. Hydatid cyst of the lower pole of left kidney with curvilinear calcification.

tic shape of space that may be seen as a cup, crescent or the wine-glass sign in the pyelogram[21] (Fig.11, case 9).

3 — *The Open Cyst:* In the open cyst there is continuous or intermittent communication between the cyst and calyceal system and the wine-glass sign or false crescent is often demonstrated (Fig.12, Case 10).

If contrast media enters an open cyst in which daughter cysts are located, the dye around the daughter cyst will produce an image suggestive of a bunch of grapes in the cavity of the cyst. If there are no daughter cysts present, the opaque material will fill the cyst and its communicating with calyces will present a picture similar to a renal carbuncle. The ureteropelvic junction may be plugged by the hydatid material, or hydatid debris may pass through the urinary tract. The possibility of secondary implantation along the urinary tract should be borne in mind and looked for.[13]

Intermittent communication between the cyst and calyceal system will

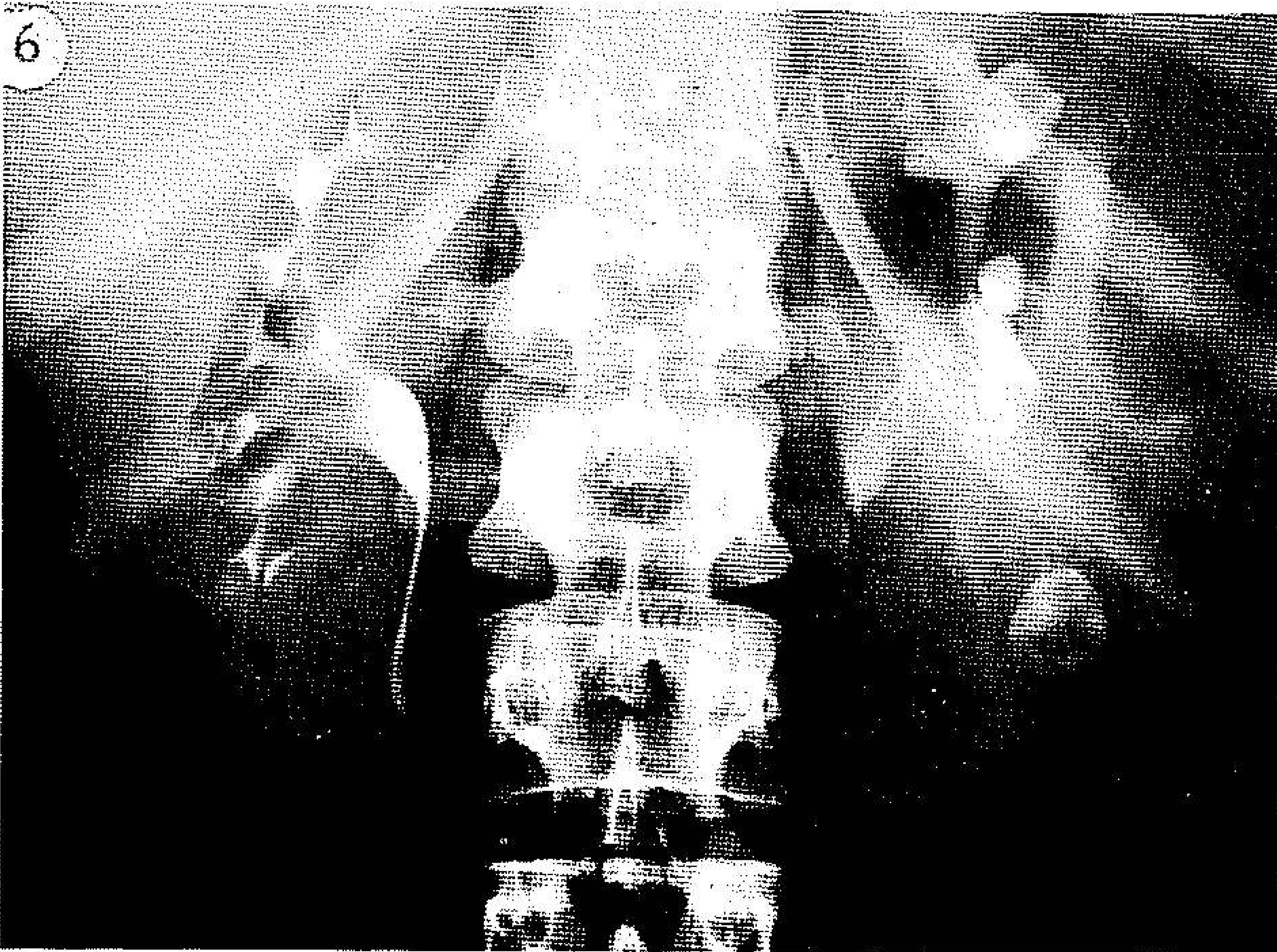


Fig. 6. Case 4. Hydatid cyst of the mid portion of the left kidney with caliec tasis

occur when the cyst is very large and mostly located in the lower pole of the kidney. This cyst will displace the lower calyces and the pelvis.

Leakage through the opening will decrease the tension and consequently

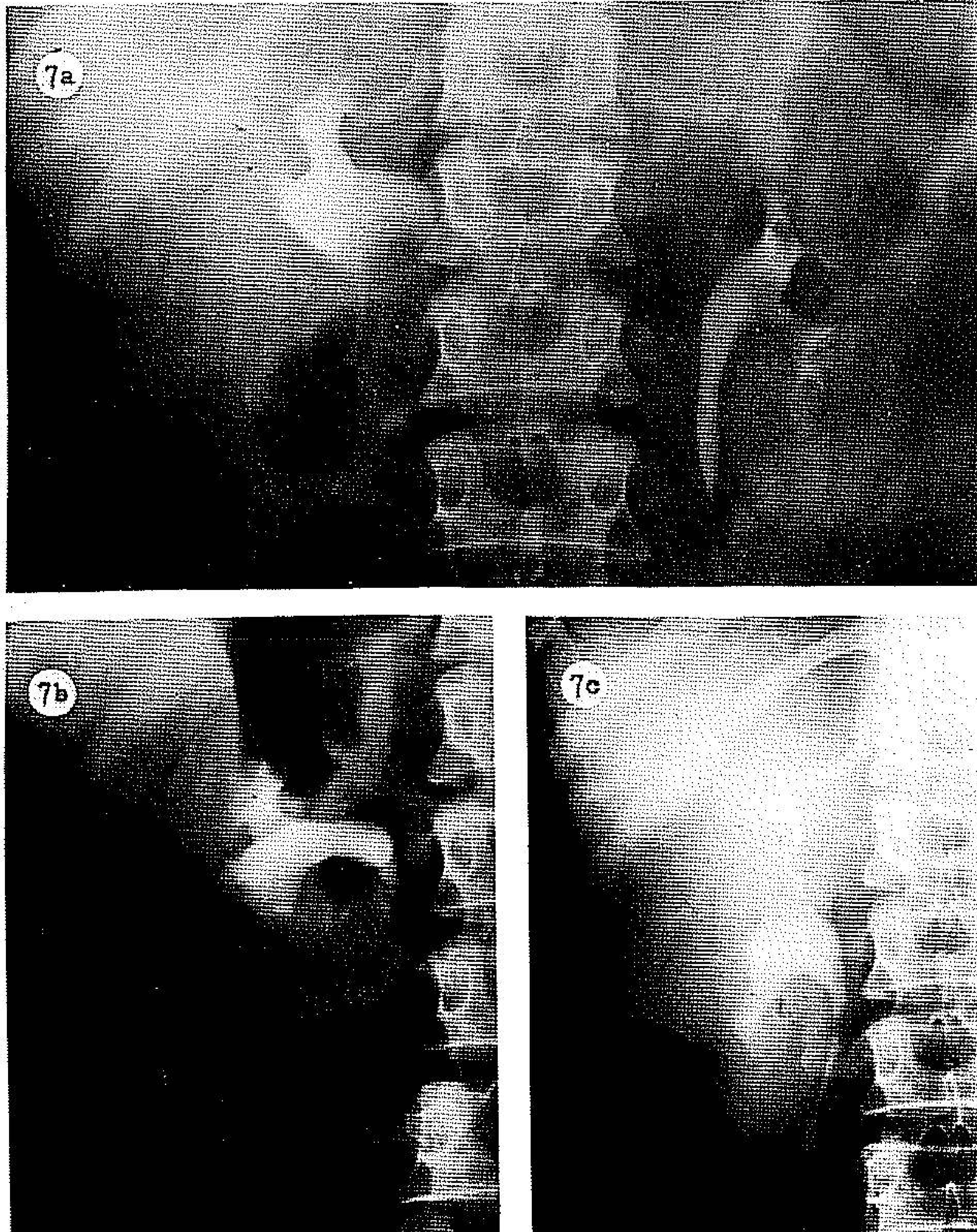


Fig. 7. Case 5. (a) Hydatid cyst of the lower pole of the right kidney showing displacement of lower calyces. (b) After removal of the cyst (c) Recurrence of the cyst after nine years.

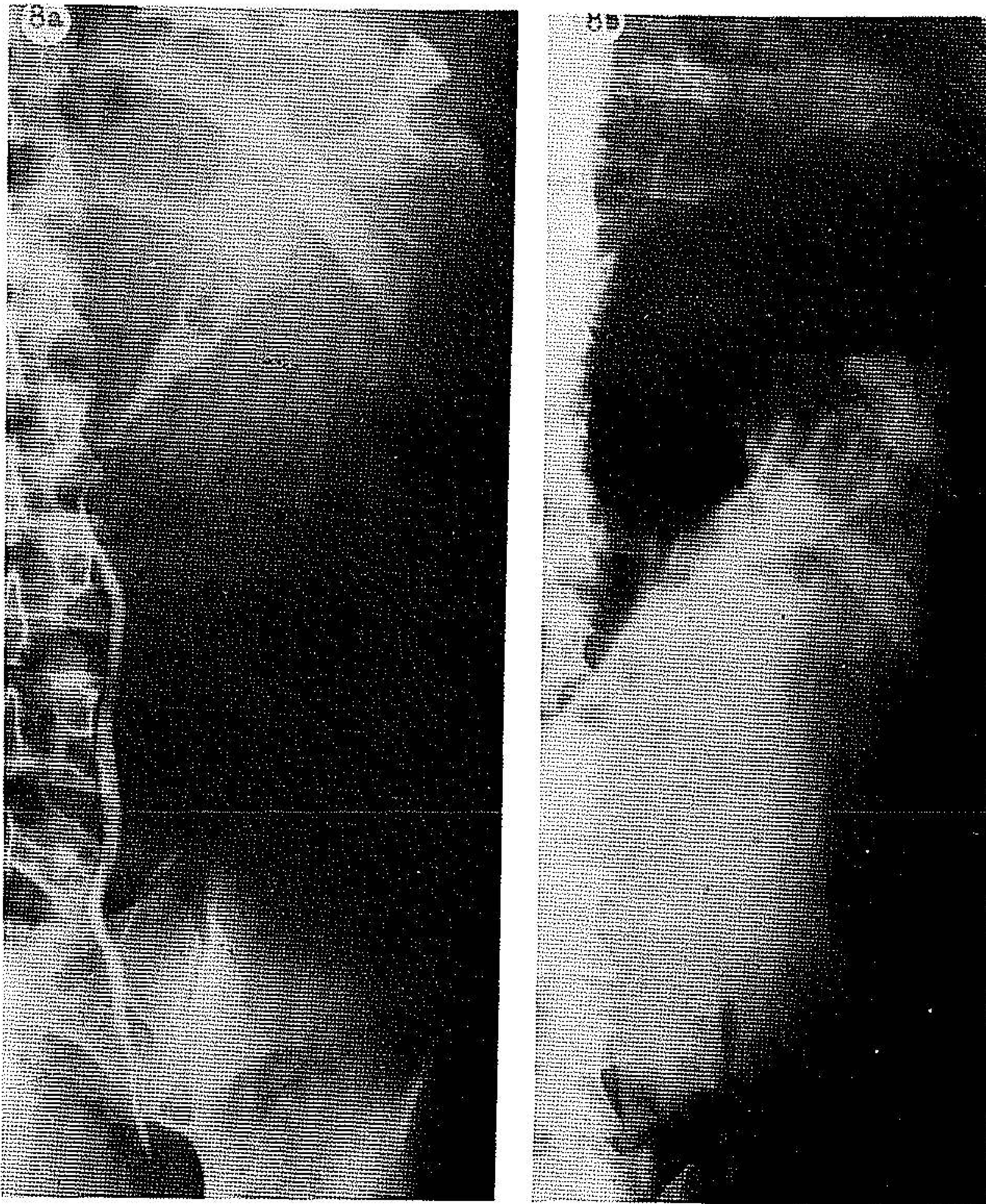


Fig. 8. Case 6. (a) Retrograde pyelogram shows displacement of the calyceal system and generalized ectasia. (b) Pneumoretroperitoneum shows outline of the cyst.

the opening will be closed temporarily (Fig.13, case 11). The patient may remain asymptomatic after a renal colic due to the passage of the hydatid debris. In this condition diagnosis will be established by finding hydatid debris and scolices in the urine. (Case 10,11 and 12).

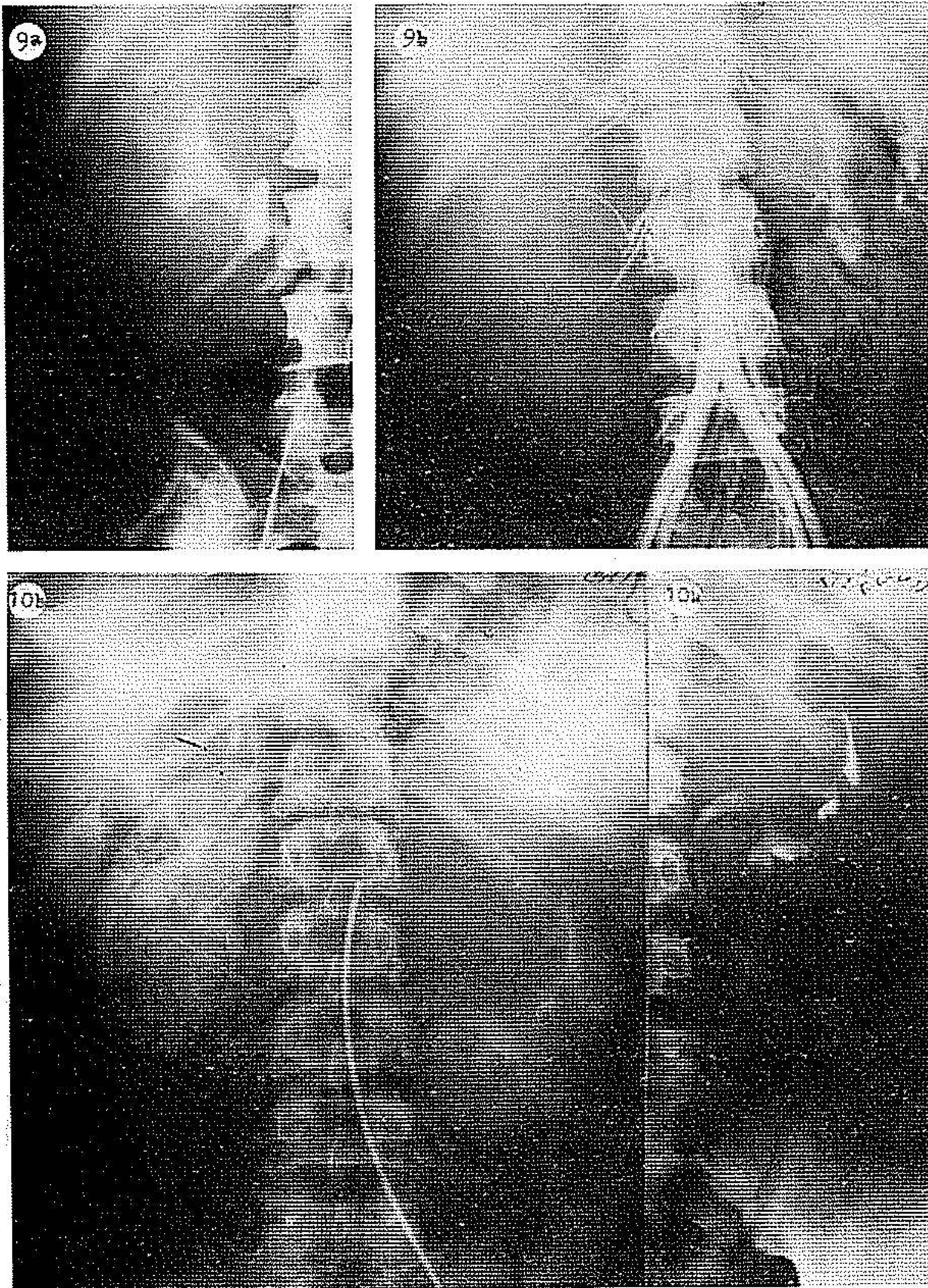


Fig. 9. Case 7. Arteriography shows a large avascular cyst.

Fig. 10. Case 8. (a) Intraceneous pyelogram demonstrating "Sit" type deformity of calyceal system in hydatid cyst of kidney. (b) arteriography reveals an avascular renal cyst. Nephrography shows a large translucent area corresponding to the cyst.

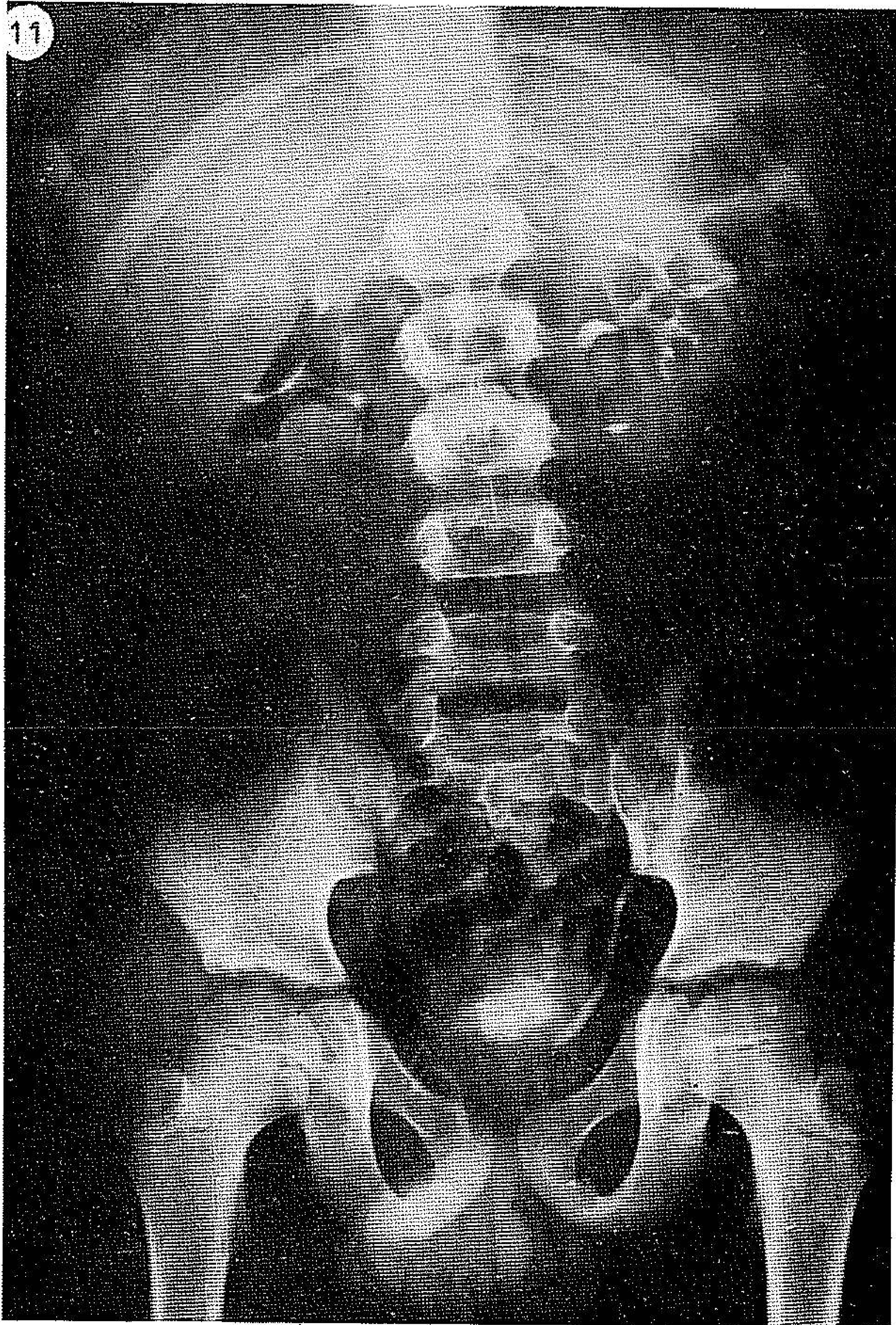


Fig. 11. Case 9. (a) I.V.P. shows crescent or the wine-glass sign with thin calcified lien in the wall of the cyst.

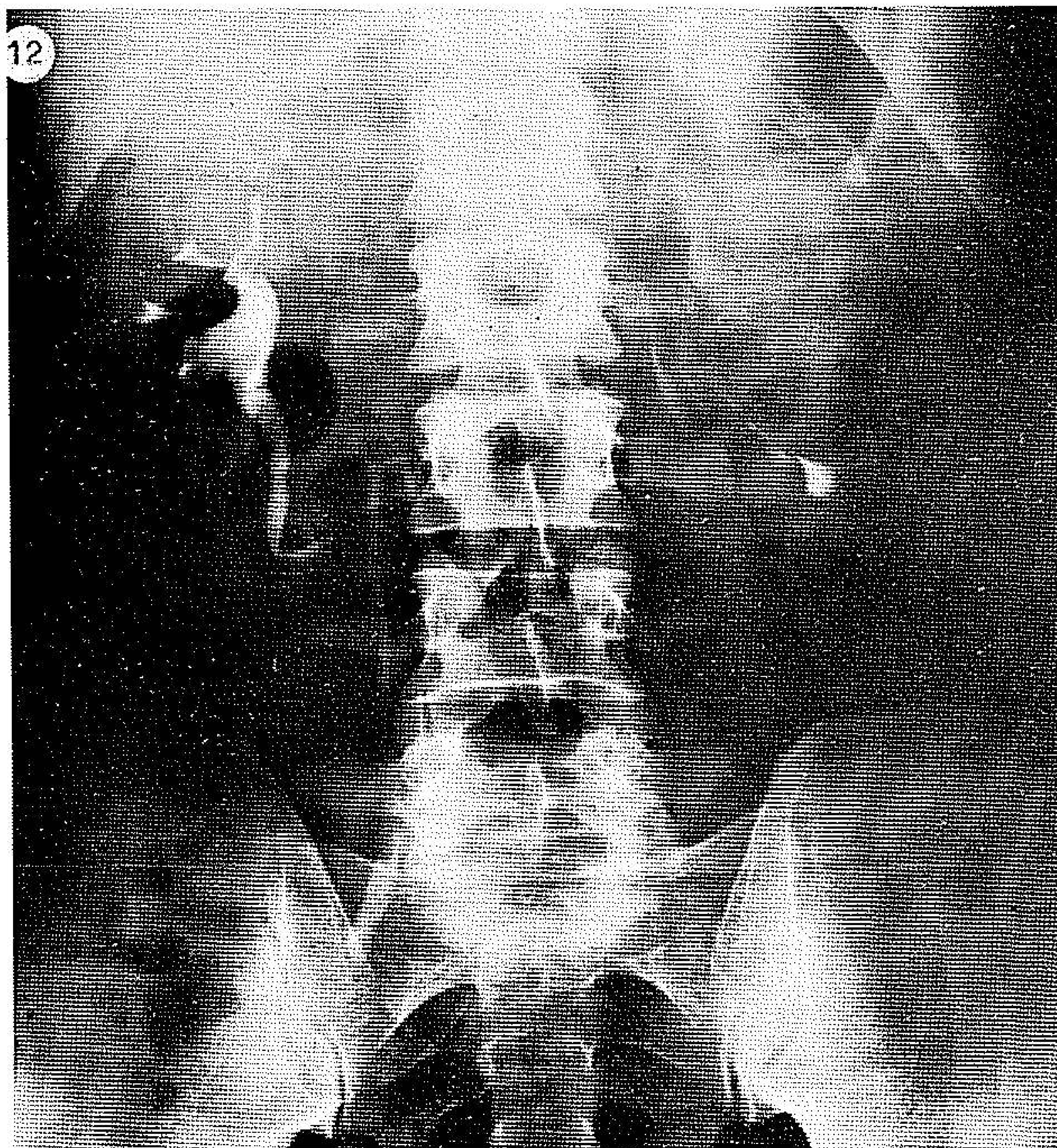
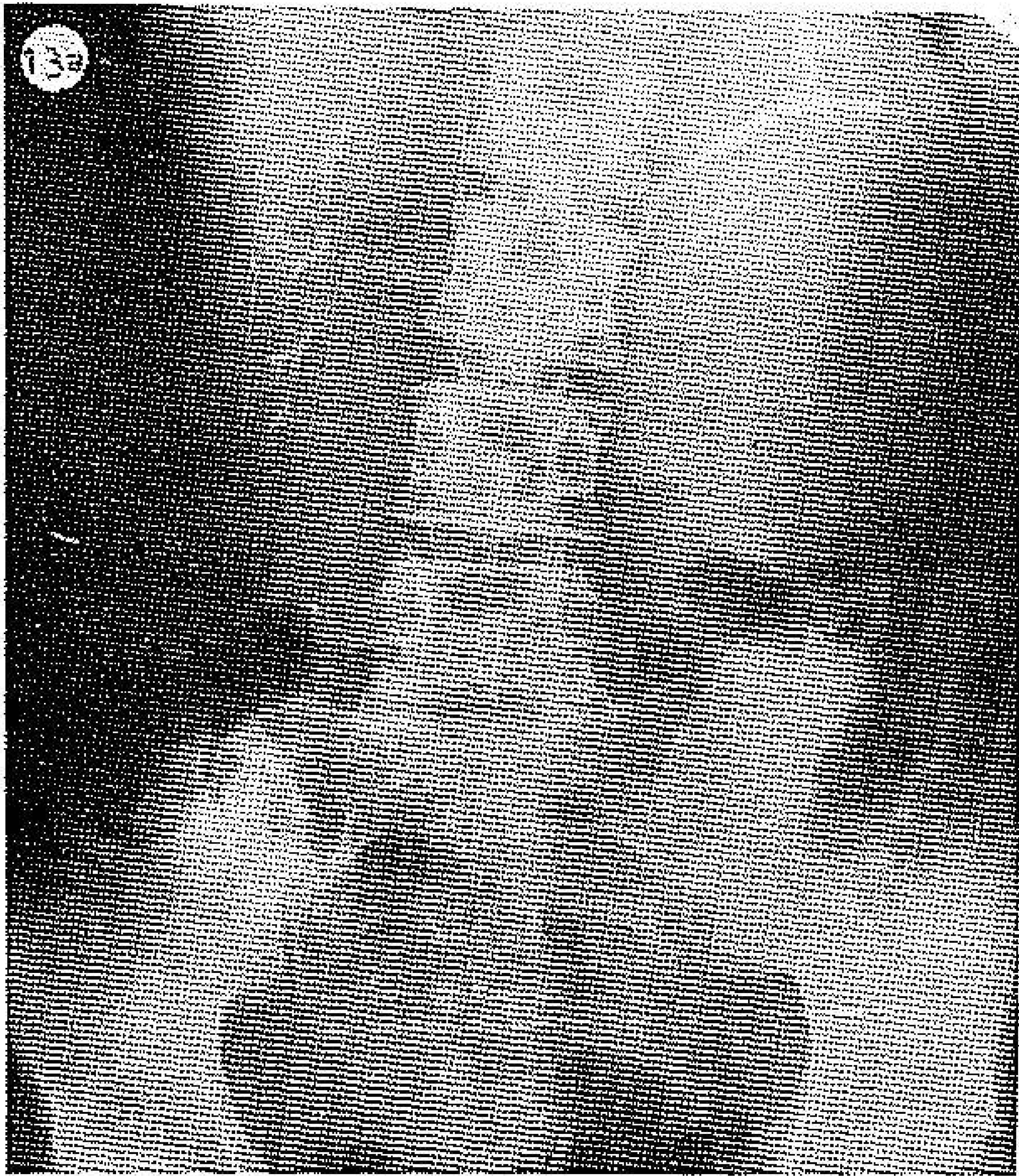


Fig. 12. Case 10. Intraveneous pyelogram revealing curvilinear calcification of the cyst in the mid portion of the left kidney.

4 — *The Multiplication of Hydatid Cyst:* Multiple hydatid cysts are not uncommon in hydatid disease of bone.[20] This kind of development

Fig. 13. Case 11. (a) I.V.P. reveals a large hydatid cyst in the lower pole of the left kidney. (b) The cyst is smaller after its contents are discharged. →

Fig. 14. Case 12. Retrograde pyelogram demonstrating multiplication of hydatid cysts of the kidney which resembles a bunch of grapes. →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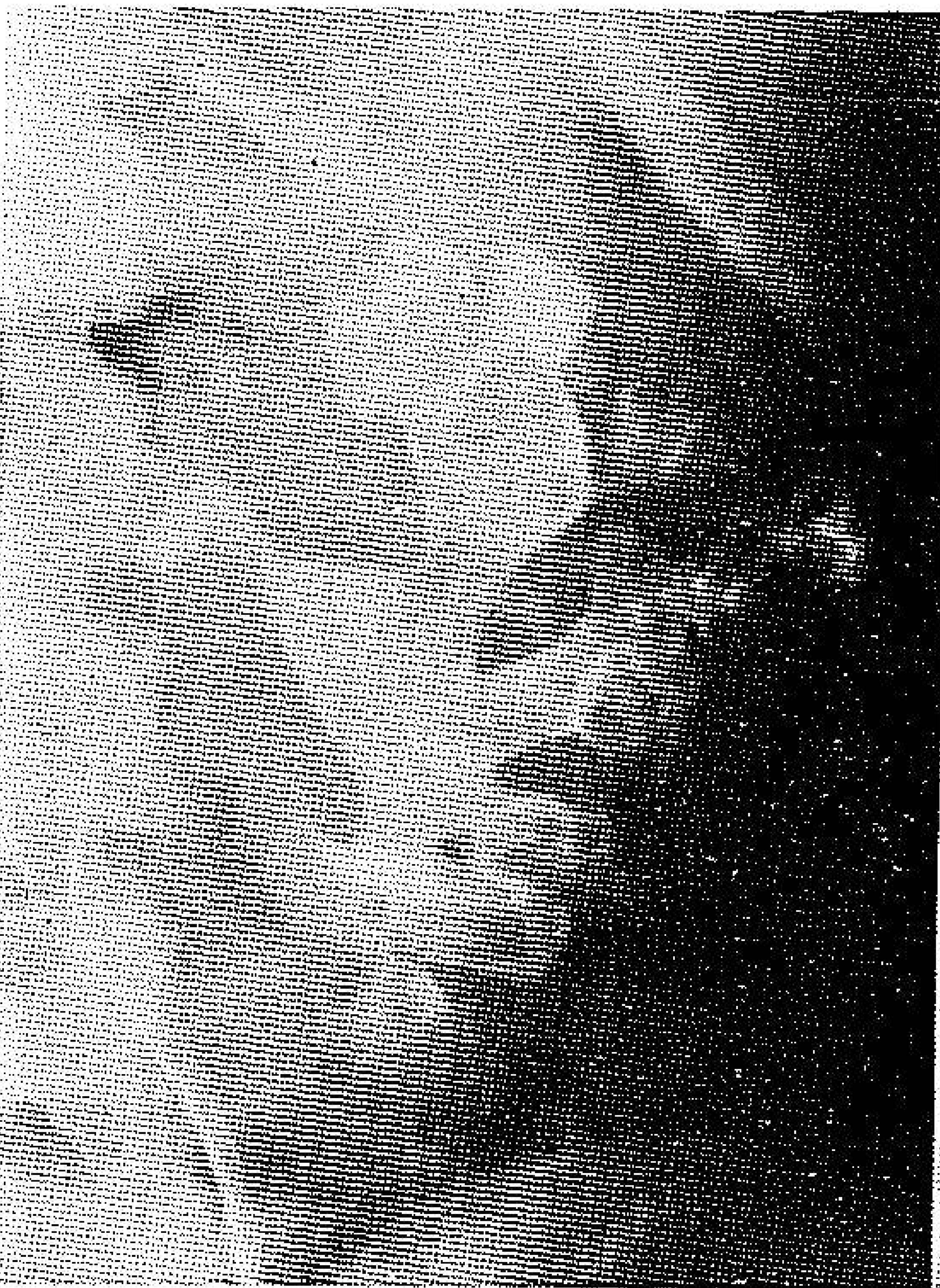

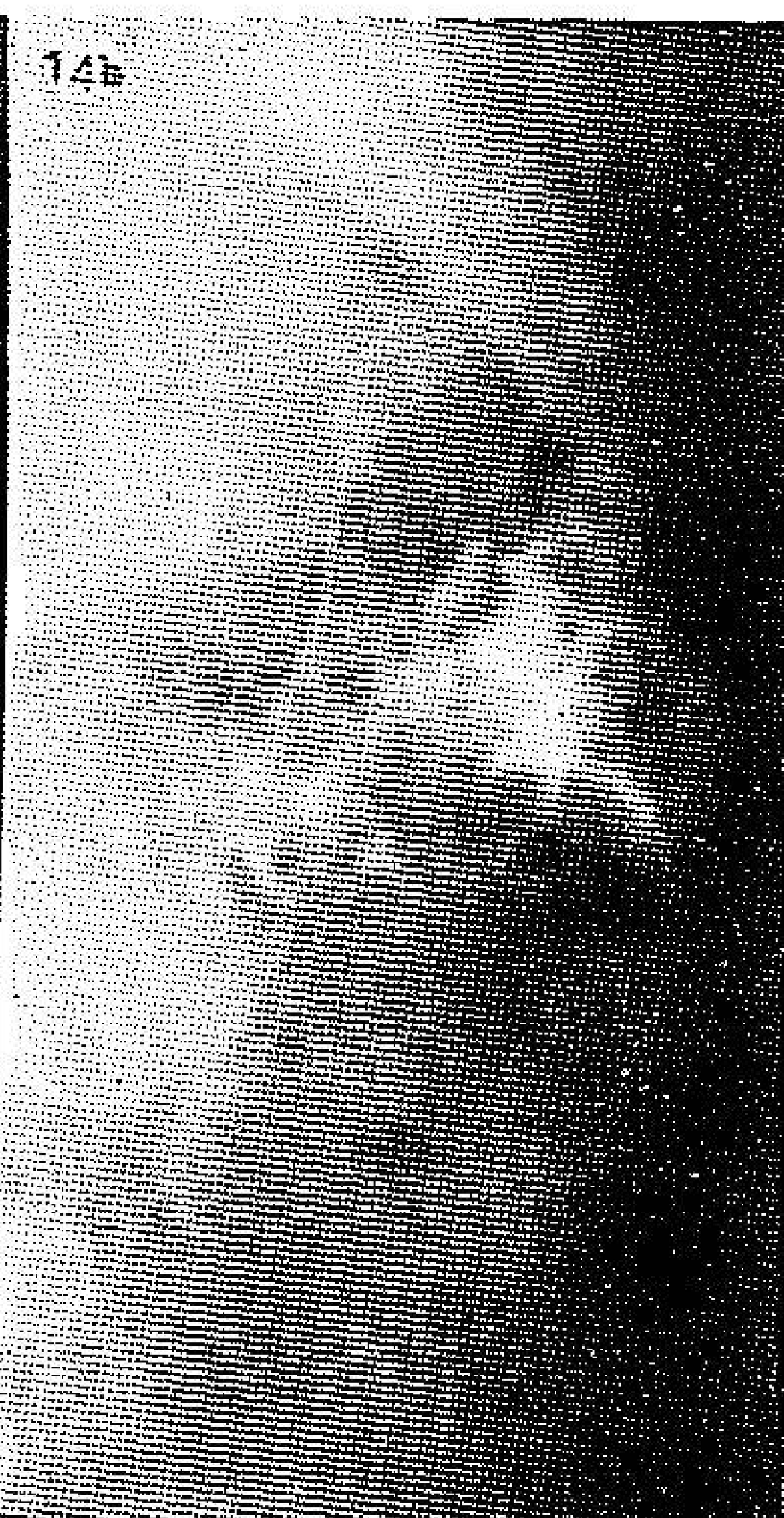
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Table 1 Review of cases.

No of cases	Age Yrs	Sex	Chief Complaint	Location	Eosinóphilia.	Hydatiduria.	Weinberg or Casoni tests.	Adventitia dense	Curvelinear calcification.	Location of the Cyst	Treatment	Recurrence
1	24	M	Pain and heaviness	Lt. flank	26	–	was not done	+	+	Lower pole	Nephrectomy	–
2	18	F	Heaviness and swelling (Mass)	Lt. 〃	–	–	–	+	–	Upper pole	Nephrectomy	–
3	52	F	Dull pain	Lt. 〃	–	–	–	+	+	Lower pole	Marsupilization	–
4	28	F	Pain, urinary disorder	Lt. 〃	–	–	–	+	+	Med. part	Nephrectomy	–
5	30	F	Tender mass with heaviness	Rt. 〃	–	–	+	+	–	Lower pole	Partial nephrectomy	Recurrenc after 9 years.
6	35	M	Pain, chills, fever, pyuria hematuria.	Lt. 〃	–	–	–	+	–	Lower pole	Nephrectomy	–
7	35	F	Tender mass	Rt. 〃	2	–	was not done	+	+	Med. part	Nephrectomy	–
8	17	M	Mass with urinary disorder	Lt. 〃	2	–	+	+	+	Upper pole	Exploratory operation.	–
9	10	M	Fistula, stricture of urethra with urinary disorder.	Rt. 〃	6	–	was not done	+	+	Upper pole	Nephrectomy	–
10	26	M	Intermittent renal colic.	Lt. 〃	–	+	was not done	+	+	Med. part	Nephrectomy	–
11	50	M	Renal colics	Lt. 〃	–	+	was not done	+	+	Lower pole	None	–
12	15	M	Pain, urinary retention	Lt. 〃	–	+	–	+	–	Multiplication of cysts	Nephrectomy	–

was termed by Dew[6] as "Exogenous vesiculation". This condition is very rare in the soft tissues. In one of our cases multiple small cysts up to 3 cm. in diameter were found within the renal cortex, calyces and pelvis (Fig.14, case 12). A few cases of multiple hydatid cysts of the kidney have been reported.[8-3]

5 — *Calcified Hydatid Cyst:* The complete calcification and death of the parasite has been reported in a few cases where calcification was massive and non-homogenous. This phenomenom depends on the body's resistance and antigen-antibody balance etc. This is not very common in the kidney but it happens more often in other organs such as in liver.

SUMMARY

The radiology diagnosis of primary hydatid disease of the kidney is possible when a renal mass is noted on the radiograph, particularly in the countries where this disease is prevalent. Characteristic radiological signs, hydatiduria, eosinophili and specific examination such as Casoni and Weinberg tests are all helpful to assist the diagnosis.

Twelve cases of primary hydatid disease of the kidney have been seen in our 10 years study. The diagnosis in the majority of these cases was primarily radiological. In three cases hydatiduria was observed. In one case in which resection of the cyst and partial nephrectomy was done recurrence was observed after nine years.

Etude radiologique de 12 cas de kyst hydatique primitive du rein.

La diagnostique radiologique de kyst hydatique primitive renale est possible, quand on peut noter une masse renale en radiographie, particulierement dans les contreés ou cette maladie est prevalente.

Les signes radiologiques characteristiques, hydatidurie, eosinophilie, et examen specifiques, comme teste de Casoni, et Weimberg assistent au diagnostique. Auteur a presenté 12 cas de kyst hydatique primitive renal, diagnostiqué radiologiquement pendant ces dix derniers annees. Dans trois cas hydatidurie etait observe et dans un cas, 9 ans apres la nephrectomie partielle et resection de kyst, on a remarque la rechutte de la maladie.

References

1. Ali Hydar Taspinar. (1967). Kyste hydatique rénal. *Rev. Medical du Orient*, 5,533-450.

2. Berger, I.R. and Cowart, G.T. (1954). Renal hydatid disease. *Radiology*, *62*, 852-857.

3. Calas. R. et al. (1964). Renal hydatid cyst. *J. Urol, Neph. Paris*, *70*, 671-673.

4. Deliveliotis. P. Kehayas and M. Varkarakis. (1968). Diagnostic problem of hydatid disease of kidney. *J. Urol. Neph.* *99*, 139-147.

5. Deve Felix, L'echinococcose rénal secondaire pyélogénetique. *C.R. SOC. de Biol.* 28 March 1942.

6. Dew, H.R. (1955). Primary cerebral hydatid disease. *Aust. N.Z.J. Surg.*, *24*, 161-171.

7. Frank M. and Mitchchell. N. (1966). Primary rénal echinococcus, a case report. *Am. J. of Trop. Medi. U.S.A.* *15*, 168-71.

8. Goldstein, H.H., Leibrman, M.L. and Obester G.F. (1959). Echinococcus disease of the kidney, report of a case of unusual size, *J. Urol.*, *81*, 596-601.

9. Huffman. W.L. (1957). Echinococcus of the knidney. *J. Urol.*. *78*, 17-21.

10. Jahrumi, M. (1968). Renal hedatid cyst; a case report. *J. of Medical Faculty of Teheran*, *25*, 780-785. (Persian).

11. James D. Henry, David C. Utz. et al. (1966). Echinococcal disease of the kidney, report of case. *J. Urol.*, *96*, 431-435.

12. Keith, Kirland. (1966). Urological aspects of hydatid disease. *Brit. J. Urol.*, *38*, 241-254.

13. Kenneth, J. Mac Kinnois. (1964). Renal hydatid disease. Montreal, *Canada Med. Ass. J.*, *90*, 689-679.

14. Lhez et al. (1965). Hydatid cyst of the kidney. *J. Urol. Neph. Paris*, *71*, 648-650.

15. Makki. H. (1967). Renal hydatid disease. *Brit. J. Surg.*, *(1967)*. *54*, 265-269.

16. Milly B. Wasson. (1950). Discussion of hydatid cyst of kidney. *J. Urol.*, *64*. 53-55.

17. Paul W. A. and Gechman. E. (1956). Echinococcus renal cyst cured by partial nephrectomy. *J. Urol.* *76*, 23-30.

18. Pytel A.J. (1959). *Manual of surgery*. Vol. 9 P. 300, State Medical publishing house, Moscow.

19. Reay E.R. and Rolletan. G.L. (1950). Diagnosis of hydatid cyst of kidney. *J. Urol.*, *64*, 26-52.

20. Samiy E. Fazl Ali Zadeh Y. (1965). Cranial and intracranial hydatidosis with special reference to roentgen-ray diagnosis. *J. Neurosurgery*, *12*, 425-433.

21. Surraco L.A. (1939). Renal hydatidosis, *Am. J. Surg.*, *44*, 581-586.

22. Teplick I.G. Labiss. M. and Strenberg S. (1957). Echinococcus of the kidney. *J. Urol.*, *78*, 323-3.7.

23. Vegas M.H. and Cranwell D.J. (1901).*Los Quistos hidatidicos en la republica Argentina.* Imprinta y casa edtoro de coni hermanous Buenos Aires, 4-66.