HORSE SHOE KIDNEY

Pages with reference to book, From 178 To 181

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Abstract

Twenty cases of horse shoe Kidney seen over a period of 4 years are presented in this study. The clinical features, embryology, investigations and treatment are discussed. The contention that horse shoe kidney is more prone to pathological change than the normal kidney has also been supported in the series. These changes were stone formation, infection, hydronephrosis and impairment of function. After the first series of investigations 50% of cases needed heminephry. It is therefore strongly recommended that the isthmus should be divided for any patient who presents with a horse shoe kidney, with or without any apparent pathology, provided both sides are functioning properly (JPMA 30:178, 1980).

Introduction

The term horse shoe kidney describes the fusion of two kidneys usually at the lower pole, over the spine in the midline. The isthmus is usually a solid paranchyma or rarely, fibrous tissues. With the exception of duplication, horse shoe kidney is the most common non-fatal anomaly occurring in renal development (Barrie et al., 1975). Horse shoe kidney occurs in 1-600/ 1-1800 individuals (Campbell, 1970) and is more common in males than in females. This anomaly occurs in the fifth to seventh week of embryonic life when fusion of the renal blastemas takes place while the primitive kidney formed from the metanephros, is in the process of ascent from its pelvic position (Boyden, 1931,32). The kidney becomes arrested below the level of the inferior mesenteric artery and the isthmus now lies across the aortic bifurcation, usually at the level of the 3rd and 4th lumber vertebrae (Siagy, 1952). Sometimes the isthmus may overlie the 12th dorsal vertebra or the sacral promontory. It may also be situated within the bony pelvis behind the bladder or on either side of the abdomen. This is known as crossed dystopia (Campbell, 1970). Virtually every disease which is found in normal kidneys has been described in horse shoe kidney (Kilpatrick ,1967). However the patient with a horse shoe kidney is particularly vulnerable to obstructive, calculus and infective diseases. A patient with a calculus presents with the typical symptoms of that condition whereas most patients present themselves with urinary tract infections, periumbilical pain radiating to the lumber region or with a mass below the umbilicus, or in either the lumber or hypochond rial region.

The key diagnostic factor is the observation of a characteristic malrotation of the calyces and a deviation of the long axis of the kidney on I.V.P. (Lobe et al., 1978). Plain abdominal X-ray retrograde pyelogram, aortography and renal scan (Fig. 1)

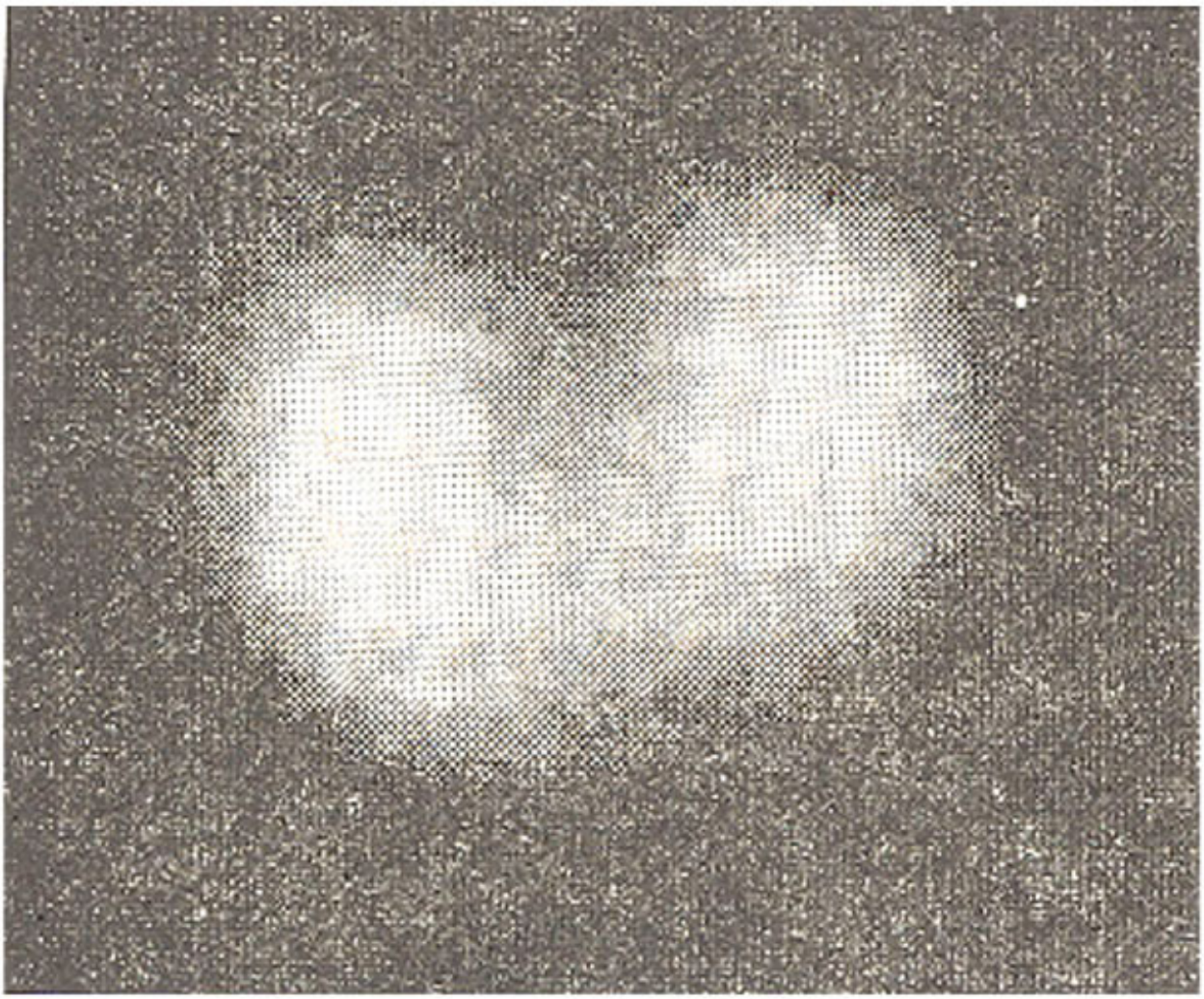

Fig. 1: A typical kidney scan in Horse shoe kidney (Case 12/MA)

can also be helpful when the diagnosis is difficult (Allen and Riley, 1963). The plain abdominal X-ray shows the renal shadows to be lying closer to the vertebral bodies and at a lower level, the lower poles lie closer to the vertebral bodies than the upper ones. The long axis projects medially from the superior to the isthmus connecting the two kidneys appear as a soft tissue mass crossing the vertebral column. The presence of calculus in an oblique or transverse position near or over the spine should arouse suspicion (Frieden-berg and Ney, 1966). On the excretion urogram (I.V.P.) and. also on a retrograde pyelogram the lowest calyx is directed towards the vertebral column or all the calyces are reversed (Fig. 2).

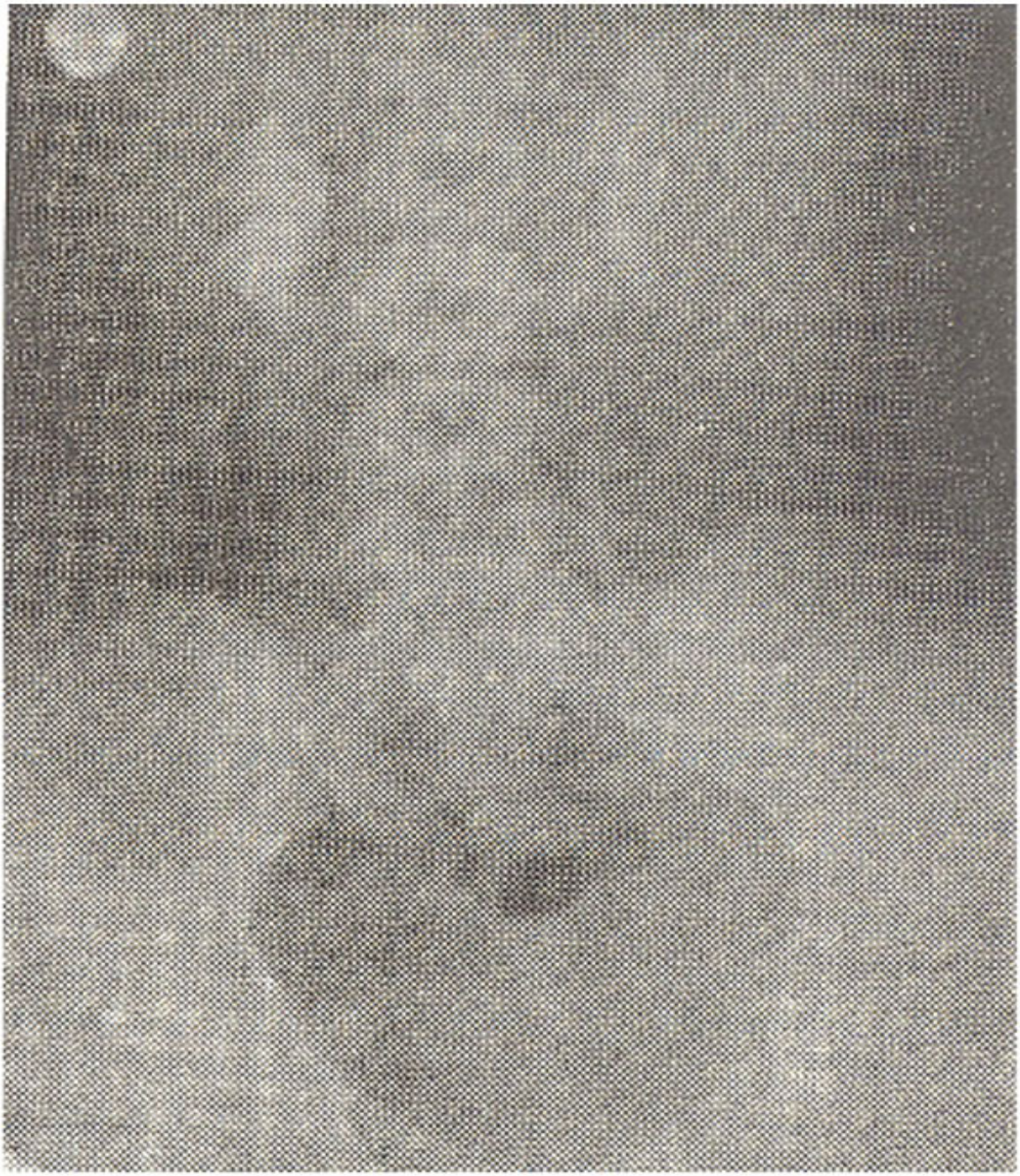

Fig. 2: I.V.P. of a horse shoe kidney lowest calyx is medial to the ureter on the right side. All the calyses and pelvis of the kidney on the left side are reversed in direction (Case I/N).

The ureters enter the pelvis higher up passing anteriorly, over the isthmus, giving the impression of a flower vase. There may also be some degree of unilateral or bilateral hydronephrosis.

Presentation

This review extends over a four year period (1976-79), during which time 20 patients were diagnosed

as having the anomaly of a horse shoe kidney . One patient with a crossed dysto pia is also included in this series. Diagnosis was established by a kidney scan in one patient, by surgical exploration in two patients and by classical urological investigations in 17 patients. Thirteen patients were males, 7 were females and ages ranged from 8 to 55 years. On X-ray 19 patients had a solid isthmus. In 3 patients it was at the level of the thitd lumber vertebra (L3), in 13 at the level of L4 and in 3 patients at the level of L5. One patient was seen to have a fibrous isthmus at the level of the fourth lumber vertebra (L4). Nine patients presented with non functioning or very poorly functioning kidneys on one side. One patient had complete anuria caused by the presence of a big stone on one side and carcinoma. of the lower end of the ureter blocking completely the other side. Five complained of recurrent kidney infections, one proved to have tuberculosis and another hydronephrosis, 11 patients had unilateral calculi and one bilateral (Table 1).

Table I: Renal Pathology

Pathology	*No. of cases*
Stones	12
Stones, anurea with carcinoma	1
Infection	5
T.B. Kidney	1
Hydronephrosis	1

Three patients had already undergone surgery elsewhere, one with recurrent stones, the second had poorly functioning kidneys and the third came with poorly functioning kidneys and urinary fistula. In all 3 patients the first operation, pyelolithotomy, was done without division of the isthmus.

Treatment

In nine patients who presented with non or poor functioning kidneys removal of the diseased half of the kidney was offered. Two patients refused while the others seven accepted. At the time of surgery one patient was found to have a huge hydronephrosis on the right side. Five patients suffering from recurrent infection and one with tuberculosis were offered division of the isthmus. All six patients refused surgery. There were five patients who, in spite of stones, had good kidney function. Two had a partial nephrectomy, one a simple pyelolithotomy and two had pyelolithotomy combined with division of the isthmus (Table II).

Table II: Treatment Horse shoe Kidney

Treatment	Number	Recurrence
Nil	7	—
Hemi-nephrectomy	7	Nil
Partial nephrectomy	2	Nil
Pyelolithotomy with Division Isthmus	2	Nil
Pyelolithotomy	1	1
Pyelostomy	1	—

Finally, one of our patients was suffering from complete anuria anda high blood urea. A pyelostomy was performed on the side without a stone. Later excision of the lower end of the ureter containing transitional cell carcinoma was carried out followed by radiation.

Results

Among the patients who had combined division of the isthmus with pyelolithotomy or partial nephrectomy or heminephrectomy only one had a minor reactionary haemorrhage. None of these patients suffered from post operative permanent urinary fistula or recurrence of stone. One patient on whom only a pyelolithotomy was performed had a recurrence of the stone six months after surgery. In patients on whom heminephrectomy was carried out, one patient had a urinary fistula for three months. No patient showed evidence of any other congenital anomaly.

Discussion

Horse shoe kidney is vulnerable to obstruction and calculous disease. The high rate of stone formation is probably secondary to infection and poor drainage from the renal pelvis (Pitts and Muecke, 1975). The abnormal location of the pelvis (on the anterior surface of the kidney), high insertion of the ureter and the frequent absence of the pelvis proper all favour impediment of flow and subsequent stagnation and infection of urine. In the presence of a horse shoe kidney the normal descent of the ureters in the

abdomen suffers interference. When crossing the isthmus of the horse shoe kidney the ureters are forced to bend sharply over and around the isthmus thus causing some degree of obstruction (Eisendrath et al., 1935; Campbell, 1970). The compression of blood vessels, nerves and lymphatics caused by the horse shoe kidney interferes with the dynamic physiological contractions of the excretory apparatus (Guttierrez, 1931-32). This would seem to be the reason why 10 out of 20 patients proved to have poor or non functioning kidneys on the first examination and subsequently required hemi-nephrectomy. One out of the 10 patients was suffering from complete anuria. One patien on whom a simple pyelolithotomy without division of the isthmus was performed and the 3 patients who had undergone same surgery elsewhere all suffered from recurrence of stones. In the 4 cases where the isthmus was divided and the stones were removed (including two partial nephrectomy) there was no recurrence of stones. Out of 20 only one patient had a hydronephrosis resulting in non-function. This may be compared to 15% of the horse shoe kidneys having hydronephrosis reported by Pitts and Muecke (1975).

We support Lowsley (1952), Dehlen and Schlumberger (1957), Kolln et al (1972), Kil-patrick (1967), Culp and Winterringer (1955) in their conviction that the division of the isthmus improves the function of the kidneys whether there is any apparent pathology or not. We consider that of division of the isthmus had been carried out in good time for ten of our patients there would have been no recurrence of stone or functional disarrangement of the kidney. Six of our patients with recurrent infection and tuberculosis are showing no improvement inspite of intensive chemotherapy. In all probability they will either develop stone or poor renal function. The division of the isthmus probably reflects the improvement of the drainage from the renal pelvis brought about by the extensive dissection of connective tissue around the uretero pelvic junction which is a necessary part of the renal symphysiectomy (Pitts and Muecke, 1975). The risk of haemorrhage and fistula formation may have been overemphasized reference because none of our patients who underwent division of the isthmus suffered from any of these post-operative complications. A number of non-renal pathological conditions, associated with horse shoe kidney due to the pressure and trauma ,of the aorta and inferior vena cava, have been reported by Dehlen (1957),

Guttierrez (1931, 32), Kilpatrick (1967). These are aortic aneurysm in the area of the isthmus, thrombosis of the iliac veins, phlebitis, oedema of the lower extremities, ascitis and Leriche syndrome. It is likely that division of the isthmus may also prevent these complications.

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References

1. Allen, T.D. and Riley, F.W. (1963) The renal scan: A clinical evaluation of its ability to localize functioning renal tissue. J. Urol., 90:417.
2. Barrie, W.W., Pollock, J.G. and Reid, W. (1975) Abdominal aortic surgery and horseshoe kidney. J. R. Coll. Surg. Edin., 20:124.
3. Boyden, E.A. (1931-32) Description of a horse shoe kidney associated with left inferior Vena Cava and disc shaped supra renal glands, together with a note on the accurance of horseshoe kidneys in human embryos. Anatomical Record, 51:187.
4. Campbell, M.F. Urology, Vol. 2, 3rd ed. Philadelphia, Saunders, 1970, pp. 1575-87.
5. Culp, O.S. and Winterringer, J.R. (1955) Surgical treatment of horseshoe kidney: Comparision of

results after various types of operation. J. Urol., 73:747.
6. Dahlen, C.P. and Schlumberger, F.C. (1957) Surgery of the diseased horseshoe kideny. Am. J. Surg., 93:405.
7. Eisendrath, D.N., Phifer, F.M. and Culver, H.B. (1925). Horseshoe kidney. Ann. Surg., 82:735.
8. Guttierrez, R. (1931-32) The clinical management of horse-shoe kidney. American Journal of surgery, 14:657-688; 15:132-165; 15:345-378.
9. Kolln, C.P., Boatman, D.L., Schmidt, J.D. and Flocks, R.H. (1972) Horseshoe kidnev: a review of 105 patients. J. Urol., 107:203.
10. Kilpatrick, F.R. (1967) Horseshoe kidneys. Proc. Roy. Soc. Med., 60:433.
11. Lobe, T.E., Martin, E.W., Jr., Cooperman, M., Vasko, J. and Evans, W.E. (1978) Abdominal aortic surgery in the presence of a horseshoe kidney. Ann. Surg., 188:71.
12. Lowsley, O.S. (1952) Surgery of the horseshoe kidney. J. Urol., 67:565.
13. Ney, C. and Friedenberg, R.M. Radiographic atlas of the genitourinary system, Philadelphia, Lippincott, 1966, P. 16.
14. Pitts, W.R., Jr. and Muecke, E.C. (1974) Horseshoe kidneys: 40-year experience. J. Urol., 113:743.
15. Victor, I. and Su, C.T. (1965) Horseshoe kidney associated with tumour. Review of the literature and case report of resection of inferior vena cava. J. Urol., 93:669.