

Case report

Horseshoe kidney associated with anomalous inferior vena cava

D. T. Kehagias, A. D. Gouliamos, L. J. Vlahos

Areteion Hospital, 76 Vas. Sophias Avenue, Athens 115 28, Greece

Received: 14 May 1998; Revision received: 24 July 1998; Accepted: 14 August 1998

Abstract. Horseshoe kidney associated with anomalous inferior vena cava is a rare congenital anomaly. Radiological demonstration of this combined anomaly is also uncommon, with only two cases of preisthmic inferior vena cava with horseshoe kidney in the imaging literature. We report a case of simultaneous horseshoe kidney and inferior vena cava lying anterior to the right renal moiety diagnosed by ultrasound and computed tomography.

Key words: Horseshoe kidney – Inferior vena cava – Ultrasound – Computed tomography

Introduction

Horseshoe kidney is the most common fusion anomaly of the kidney, with an incidence of between 1 in 353 and 1 in 1800. A wide variety of associated genitourinary and non-genitourinary anomalies coexist. Association with anomalous inferior vena cava (IVC) is much less frequent and the diagnosis is rarely made preoperatively. We describe a case of horseshoe kidney with the IVC located anterior to the right renal moiety, which was an incidental finding.

Case report

A 76-year-old man was admitted to our hospital with colon carcinoma. During the preoperative staging, ultrasound of the abdomen revealed a horseshoe kidney with the IVC lying anterior to the right renal moiety (Fig. 1). The aorta was in a normal position posterior to the isthmus. The patient had no history of symptoms from the urinary tract. A computed tomography (CT) examination confirmed the sonographic findings (Fig. 2). An excretory urogram showed that the right

Correspondence to: D. T. Kehagias

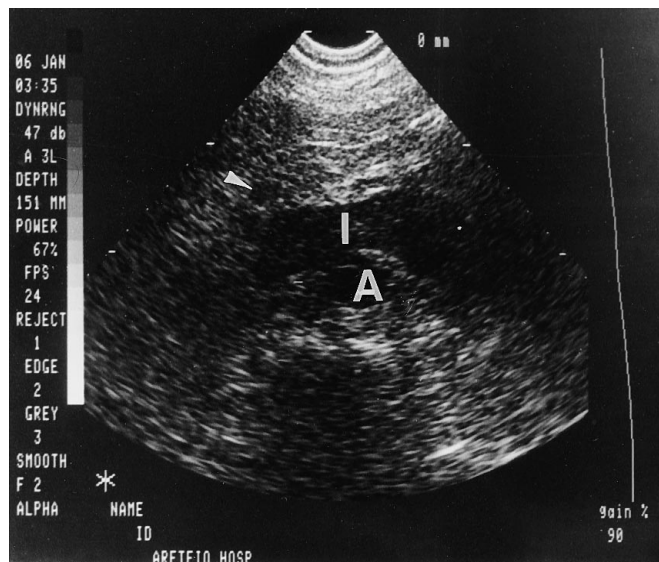


Fig. 1. Ultrasound demonstrates the horseshoe kidney with the aorta (A) posterior to the isthmus (I) and the inferior vena cava (IVC) lying anterior to the right renal moiety (arrowhead)

ureter drained the right renal moiety and the isthmus of the horseshoe kidney.

Discussion

Horseshoe kidney results from fusion of metanephric buds between weeks 4 and 8 of embryogenesis, blocking their cephalic migration and normal rotation. Typically the renal pelves and ureters are anteriorly displaced, with the ureters lying anterior to the isthmus with a tendency to kink, often resulting in hydronephrosis.

Preisthmic IVC has been described mainly as a surgical finding [1–4] and recently has been radiographically demonstrated [5, 6]. Right retrocaval ureter was associated with this anomaly. The aetiology of retrocaval ureter is that there is an anomalous infrarenal IVC because



Fig. 2. CT scan shows the horseshoe kidney lying between the IVC (arrow) and aorta

of persistence of either the right posterior cardinal or the right subcardinal venous supply. In our patient the right ureter did not show any deviation suggesting a retrocaval position.

The described case is unique in that the IVC lies anterior to the right renal moiety of a horseshoe kidney.

There was no evidence of a right retrocaval ureter on excretory urography. Impairment of renal ascent and rotation may affect the usual venous development. Modern imaging techniques can provide accurate anatomical definition and allow appropriate preoperative assessment.

References

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Book review

European
Radiology

Kleinman, P.K.: Diagnostic Imaging of Child Abuse. Second Edition. St. Louis: Mosby 1998, 439 pp., 930 illustrations, £ 65.00, ISBN 0-8151-5139-X.

The first edition of this book became established as a standard text on the imaging of children with suspected abuse. The new edition updates what was an excellent book and represents collective knowledge on the subject towards the close of the millennium.

This book deals with skeletal trauma in the first 13 chapters using a regional approach. These include chapters on radiological dating of fractures, the differential diagnosis of fractures seen in child abuse and normal variants of the skeleton in children.

Paul Kleinman is an acknowledged world expert in radiological imaging in child abuse and has a considerable research base to draw on. He describes and illustrates all the classic bone injuries. He gives a full description of the radiologically subtle fracture he calls the “classic metaphyseal lesions” (CML). He uses numerous radiographs to illustrate this type of fracture at different sites and in different stages of healing. Equally good is the chapter about bony thoracic trauma, where Kleinman describes the forces required to produce fractures in different parts of the rib.

There are excellent chapters on visceral and head trauma including the shaken baby syndrome. Dr. Kleinman gives a full discussion of the advantages and disadvantages of the different imaging modalities when imaging children suspected to be victims of abuse.

For example, skeletal scintigraphy may diagnose rib fractures that are not visible on radiographs and he discusses the value of CT, MRI and high-resolution ultrasound in the chapter on head trauma.

The chapter on differential diagnosis in child abuse includes a short classification of the subtypes of osteogenesis imperfecta. The refinement of the classification of this complex condition could, however, provide a separate book.

The final section deals with psychosocial and legal issues. Although the latter is based on the North American legal system, broad concepts and principles apply worldwide and would be useful to radiologists wherever they practise.

This book can be recommended wholeheartedly to radiologists reporting on imaging studies of children. It is informative and useful, very well referenced and practical. It is a comprehensive account of the radiology of child abuse. It represents excellent value for money especially as the number of illustrations is large. All radiology departments imaging children and all accident and emergency departments should have a copy.

Sadly, children are all too frequently maltreated, and they deserve our best efforts to diagnose abuse; this book will help us.

S. King, Liverpool