

Congenital Mesoblastic Nephroma

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Zafar Zaidi, Pierre Mouriquand (Department of Paediatric Urology, Great Ormond Street Hospital for Children, London, United Kingdom.)

Introduction

Congenital mesoblastic nephroma (CMN) is a rare lesion but in the neonatal age group is second only to sacroccygeal teratoma¹. It is thought to be variant of Wilms tumour that also arises from primitive renal cells. Molecular characterisation and pattern of gene expression² suggests that different factors are involved in the pathogenesis of these two tumours. CMN is generally a benign tumour although distant metastasis have been described³. Nephrectomy alone is the treatment of choice with survival rates of 98% reported⁴, We present 2 cases of congenital mesoblastic nephroma.

Case Report

Case I

JW a 10 day old male child was delivered at term. Antenatal ultrasounds at 20 and 36 weeks were inconclusive. At routine examination a right abdominal mass was palpated and he was referred for evaluation. On admission he was hypertensive with a blood pressure of 135/95 mm Hg. Abdominal examination confirmed a smooth, firm right sided abdominal mass. He had normal genitalia. Laboratory investigation revealed a normal urinary Hainovanillic Acid (HVA) and Vainlyl Mandelic Acid (VMA).

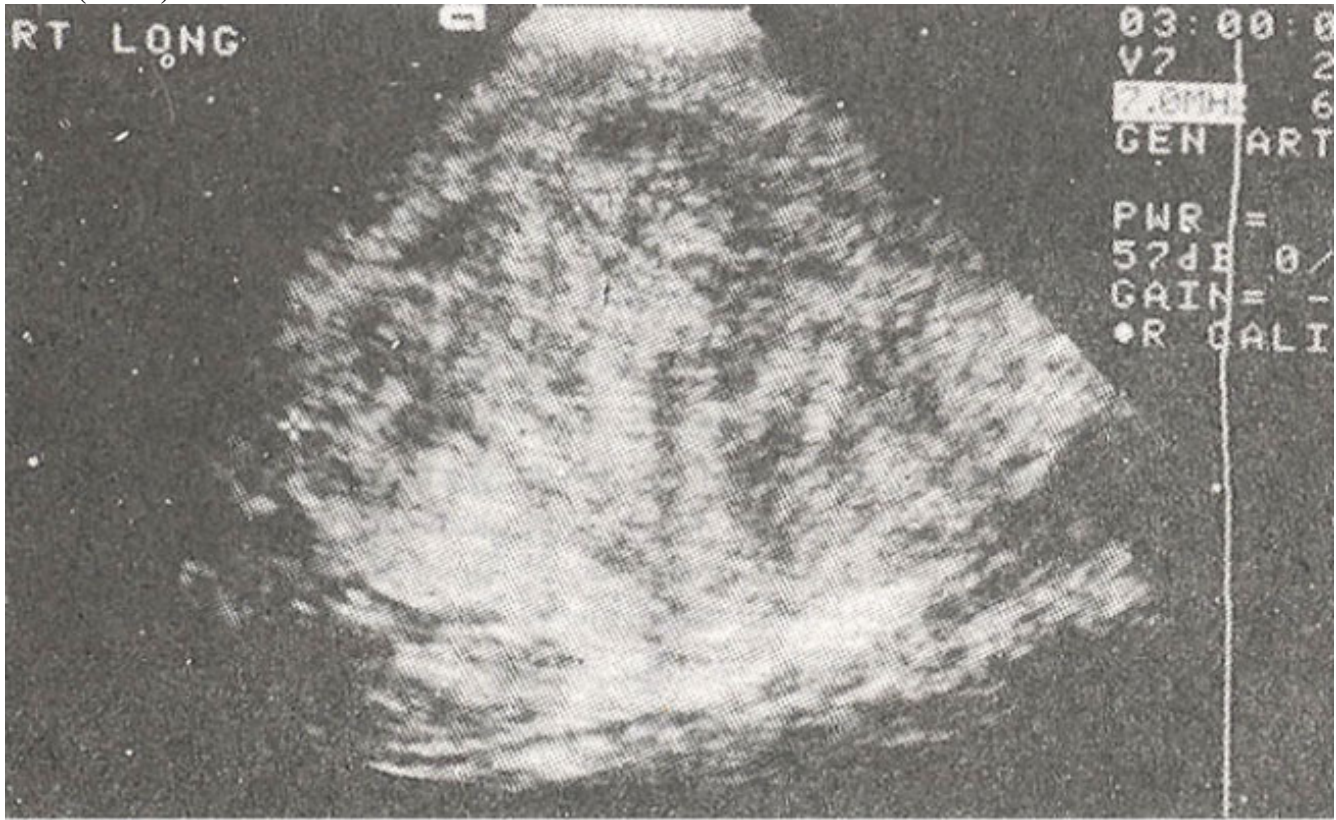


Figure 1. Ultrasound showing right kidney replaced by homogenous solid mass.

Ultrasound (Figure 1) revealed a solid, homogenous right sided renal mass without evidence of calcification. This was confirmed on CT scan (Figure 2).

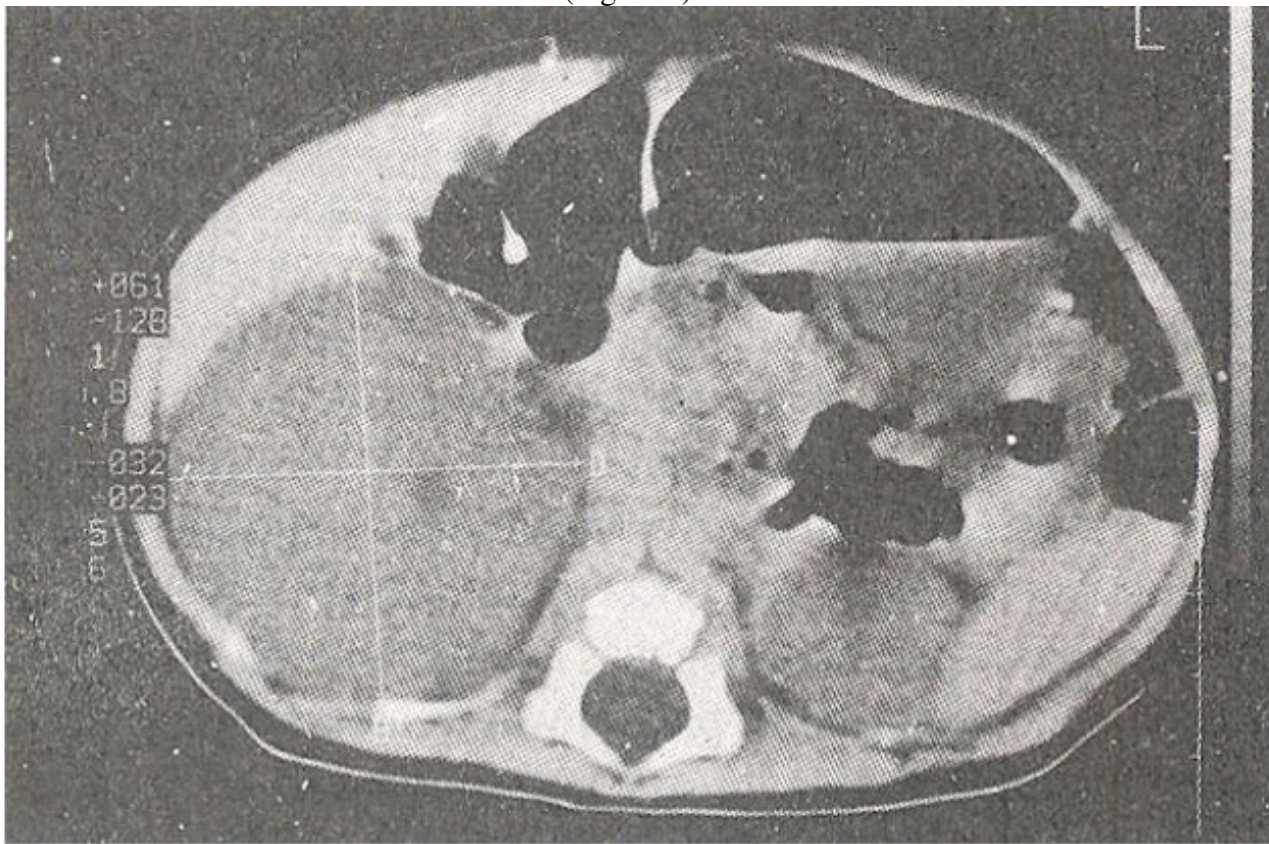


Figure 2. CT scan of abdomen showing a solid mass in right kidney without any calcifications.

The patient underwent a nephrectomy and CMN was diagnosed.

Case 2

JA, a 2 day old male child was delivered at full term. Antenatal scans at 8,11 and 20 weeks of gestation were negative. Postnatally a right sided abdominal mass was palpated and he was referred for evaluation and management. Physical examination revealed a normotensive child with normal genitalia and a smooth, firm right sided abdominal mass. Urinary HVA and VMA were normal and ultrasound confirmed a homogenous right renal mass without calcification. He also underwent a nephrectomy and histology confirmed CMN.

Congenital mesoblastic nephroma

In the 1st year of life, abdominal masses are overwhelmingly genitourinary in origin and predominantly benign, 75% of these lesions are hydronephrosis or various cystic disorders of the kidney. Multicystic renal dysplasia and congenital hydronephrosis constitute the most frequent cause of an abdominal mass in a neonate⁵. Of the neoplastic lesions, CMN is the most common solid renal neoplasm in the 1st year of life constituting approximately 80% of all solid lesions.

Approximately 60% of CMN are diagnosed before 6 months of age. Of the 3,340 patients registered in the National Wilms Tumour Study (NWTS) from 1969 to 1984 only 27 were 30 days old or less, 18 of the 27 had CMN, 1 had malignant rhabdoid tumour, 4 had Wilms tumour and 4 had non-neoplastic lesions⁶. In a review of 51 children with CMN entered into NWTS 1969-81, Howell et al reported the mean and median ages at time of diagnosis to be 3.44 and 2.25 months respectively⁷. All cases reported with one recent exception have been unilateral⁸.

Radiologically, CMN appears as a solid renal mass with low internal echoes, indistinguishable from

Wilms tumour, on ultrasound. CT scanning demonstrates a solid, homogenous mass which may show enhancement and excretion of intravenous contrast. Neither ultrasound nor CT scan can differentiate CMN from other solid neonatal tumours. Reports of uptake of Tc99m DMSA by mesoblastic nephroma are of interest^{9,10} It is the presence of tubular cells within the tumour mass that gives rise to Tc99m DMSA uptake¹⁰. This phenomenon is not seen in Wilms tumour. In the neonate and infant with a palpable mass, ultrasound should be the first test to establish that the mass is solid or cystic. All solid masses must have urinary VMA and HVA (catecholamine metabolites) checked to rule out neuroblastoma. CXR is necessary to screen for metastasis. Further imaging is optional and should be geared to likely diagnosis. In the neonate, due to the overwhelming likelihood that the mass is CMN and the poor definition seen on CT scan in this age group, an ultrasound alone probably should suffice. In infants greater than 6 months of age, CT scan is done to evaluate the retroperitoneum, IVC and the lungs as the likelihood of Wilms tumour increases.

Pathologically, CMN has been considered a benign tumour of infancy. The pathogenesis is currently unknown. Histologically the tumour is composed of spindle shaped cells arranged in interlacing bundles with adjacent renal parenchyma and foci of cystic dysplastic tubules (Figure 3).

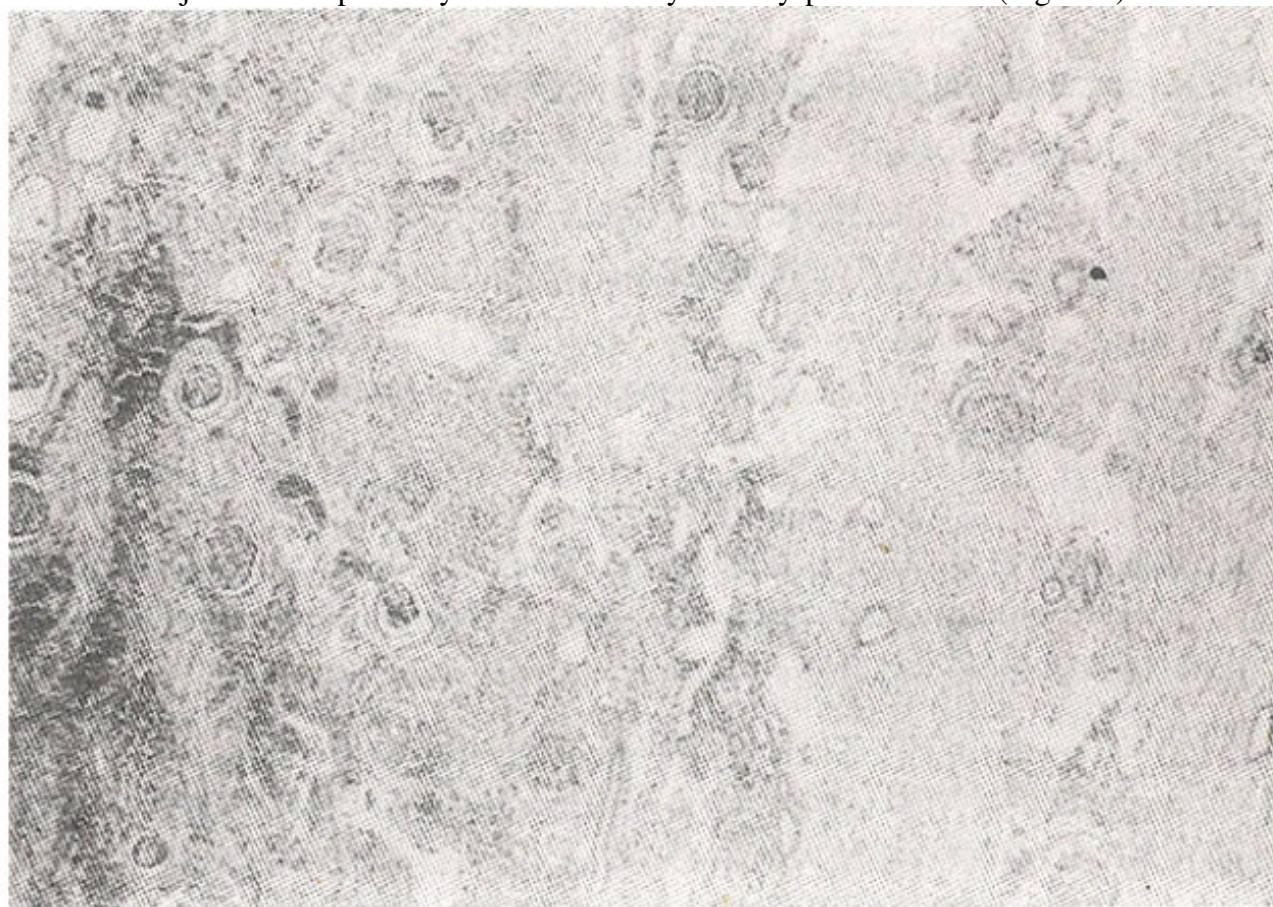


Figure 3. Typical spindle shaped cells in interlacing pattern. Infiltrative margins difficult to delineate as they extend for a considerable distance into renal parenchyma. Relatively mature looking glomeruli and tubules. No mitosis seen x50.

The tumour can trap normal tubules and glomeruli within it giving rise to Tc99mDMSA uptake. Cellular congenital mesoblastic nephroma (CCMN) is now recognized as a histologically different entity and is potentially more aggressive than CMN, perhaps similar to sarcoma¹¹. Histologically, CCMN differs from CMN by its densely packed fusiform cells arranged in featureless sheets on a myxoid background. A high mitotic rate is also usually present.

CMN and hypertension

Hypertension (HTN) can be present in patients of CMN. In a series of 12 patients with CMN treated between 1964 and 1987, Malone reported on 5 whose BP was measured preoperatively and 4 had HTN¹². In all cases BP normalized following nephrectomy. In one patient plasma renin activity was markedly raised preoperatively and returned to normal after nephrectomy. Immunohistochemical staining of the tumour was positive for renin and noted to be most intense within areas of recognizable cortex trapped within the tumour. Thus HTN in CMN appears to be renin mediated. This has important bearing during surgery and preoperative control of hypertension is important, preferably with an ACE inhibitor. An association between preoperative HTN and cardiac arrest has been noted and is likely secondary to hypotension resulting from ligating the renal vein⁷.

Treatment

Howell's report⁷ on therapy and outcome in 51 children with CMN treated include 4 patients treated with surgery, chemotherapy and radiotherapy prior to 1976, 24 patients treated with surgery and chemotherapy prior to 1978 and 23 patients treated with surgery alone after 1978¹⁰ patients had intraoperative rupture of tumour (3 treated with surgery alone). In their series of 51 patients local recurrence was seen in one patient only, despite 10 intraoperative ruptures and 8 with local extension. This study concluded that nephrectomy alone, even when there is intraoperative rupture, should suffice in management of congenital mesoblastic nephroma. The treatment of cellular congenital mesoblastic nephroma has been modified because of its potential aggressiveness. Gormley¹¹ reviewed 38 patients with CCMN. Of these 7 (18%) had recurrence or metastasis (5 local; 1 pulmonary metastasis;¹² pulmonary+local recurrence). Mortality in patients with recurrence or metastasis was 43%. Only risk factor for recurrence was the presence of a positive margin at the time of initial resection. There were no pathologic characteristics that predicted recurrence or mortality. The mean age of first recurrence was 5.4 months after initial resection. Their conclusion was that infants with CCMN and a clear surgical margin should be treated with surgery alone and close follow-up. In patients with positive marginal early re-exploration for gross residual disease and the use of chemotherapy for microscopic residual disease or tumour rupture is necessary. The standard Wilms tumour agents, vincristine and actinomycin D, were not successful in CCMN recurrence or metastasis. The addition of cyclophosphamide and doxorubicin, commonly used in sarcomatous regimens, may be helpful in CCMN recurrence.

References

1. Bolande, R.P. Benignity of neonatal tumours and concept of cancer repression in early life. *Am. J. Dis. Child.*, 1979;122: 12-14.
2. Tomilson, G.E., Argyle, J.C., Velasco, S. et al. Molecular characterization of congenital mesoblastic nephroma and its distinction from Wilms tumour. *Cancer*, 1992,70:2358-61.
3. Heidelberg, K.P., Ritchey, M.L., Dauser, R.C. et al. Congenital mesoblastic nephroma metastatic to the brain *Cancer*, 1993,72:2499-502.
4. Beckwith, J.B. Wilms tumour and other renal tumours of childhood: An update. *Urol.*, 1986;136:320-324.
5. Wedge, J.J., Grosfeld, J.L. and Smith, J.P. Abdominal masses in the newborn 63 cases. *J. Urol.*, 1971;106:770-775.
6. Harbovsky, E., Othersen, H.B. and deLorimer, A. Wilms tumour in the neonate A report from the national Wilms tumour study. *Pediatr. Surg.*, 1986,21:385-387.
7. Howell, C.G., Othersen, H.B., Kiviat, N.E. et al. Therapy and outcome in 51 children with mesoblastic nephroma: A report of the national Wilms tumour study. *Pediatr. Surg.*, 1982,17:826-

831.

8. Skoric, D., Bunjevacki, G. and Scepanovic, D. Congenital mesoblastic nephroma. *Srp, Arh. Celok, Lek.*, 1993; 121:41-44.
9. Kirks, DR. and Kaufman, R.A. Function with mesoblastic nephroma Imaging-pathologic correlation. *Podiatr. Radiol.*, 1989;19:136- 139.
10. Cowling, MG., Dicks-Mireaux, C. and Gordon, I. A further diagnostic test in neonatal/infant solid renal mass: Two cases of mesoblastic nephroma showing uptake of Tc99mDMSA. *Clin. Radiol.*, 1993;47:259-261.
11. Gormley, TS., Skoog, Si. and Jones, R V. Cellular congenital mesoblastic nephroma: What are the options. *J. Urol.*, 1989; 142:479-483.
12. Malone, P.S., Duffy, PG. and Ransley. PG. Congenital mesoblastic nephroma, rerun production and hypertension *J. Pediatr. Surg.*, 1989,24:599-600.