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CONGENITAL MESOBLASTIC NEPHROMA: A CASE REPORT AND REVIEW OF LITERATURE

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ABSTRACT

Congenital mesoblastic nephroma of infancy has been recognized for more than a decade as a different entity from the Wilms' tumor in its clinical and histopathological features. This tumor, however, is sometimes confused with Wilms' tumor and subsequently inadvertent and vigorous therapy compatible with that of Wilms' tumor is done even at present time. We reviewed the pertinent literature and analyzed 91 cases of congenital mesoblastic nephroma in English and Japanese literature. As a result we emphasized the importance of early and accurate histopathological diagnosis of the resected specimen to avoid inappropriate postoperative therapy and characterized the peculiar features of congenital mesoblastic nephroma in this paper.

INTRODUCTION

Primary renal tumors in children are generally regarded as Wilms' tumor and thus are treated vigorously as the neoplasia with malignant potentiality. These tumors, when detected at birth or within the first few months of life, are often indistinguishable in the clinical course but differs remarkably in histopathological characteristics and in postoperative course from those of Wilms' tumor. Although cases of this peculiar renal tumor have been reported in the literature with various diagnostic names, Bolande and his associates had the credit of identifying this entity as a specific and characteristic type of renal neoplasm[1]. They thought this tumor as a histologically related but differentiated variant of Wilms' tumor and therefore coined the term "congenital mesoblastic nephroma".

Though well-defined, this rare renal tumor has occasionally been confused with Wilms' tumor and subsequently inadvertent therapy has been instituted. The purpose of this paper is to emphasize the importance of early and accurate histopathological diagnosis of the resected kidney to avoid inappropriate postoperative anti-neoplastic therapy and to characterize this type of renal tumor by reviewing English and Japanese literature.

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CASE REPORT

T. K., a 9-day-old male newborn, was referred to the Pediatric Department of this hospital on October 27, 1978 with a mass in the right upper quadrant of abdomen detected on the 8th day of delivery at another hospital. The newborn was a product of uneventful delivery after 39 weeks of gestation. There was no polyhydramnios during the pregnancy. He weighed 3,330 gm and Apgar score was 10 at 5 minutes. The cord was approximately 2.5 cm in diameter and the cord around the neck was found. Upon ligation, proximal portion of the cord dilated remarkably measuring nearly 5 cm in diameter. On physical examination there were no abnormalities except for a 4× 5.5 cm abdominal mass in the right upper

quadrant and a calcified large umbilical cord attached to the abdomen. White blood count was 12,200, red blood cell 528×10^4, hemoglobin 19.3, hematocrit 56.1, blood urea nitrogen 0.7, creatinine 0.6 and bilirubin 8.1. LDH was 356 units per liter and its fractions were as follows: I 27.9 per cent, II 33.2 per cent, III 22.6 per cent, IV 8.6 per cent and V 7.7 per cent. Alpha fetoprotein on October 30, was 20,750 ng per ml and 400 ng per ml on November 27. Urinalysis and urine culture were negative, proteinuria and vanillyl mandelic acid negative. The chest X-ray was negative. An excretory urogram(IVP) at 5 minutes showed no visualization on the right side but normal on the left (Fig. 1). Echogram revealed a solid right renal tumor. Renal scan demonstrated decreased uptake of ^{99m}Tc-DMSA at the enlarged right kidney indicating the presence of right renal tumor (Fig. 2). Right Wilms' tumor (nephroblastoma) was suspected and the patient was further referred to this Urological Department for surgical removal of the renal tumor.

At surgery there was no abnormal findings at the right renal hilus and perirenal area including upper portion of the right ureter. Right nephrectomy was done without difficulty. The patient was again returned to the Pediatric Department.

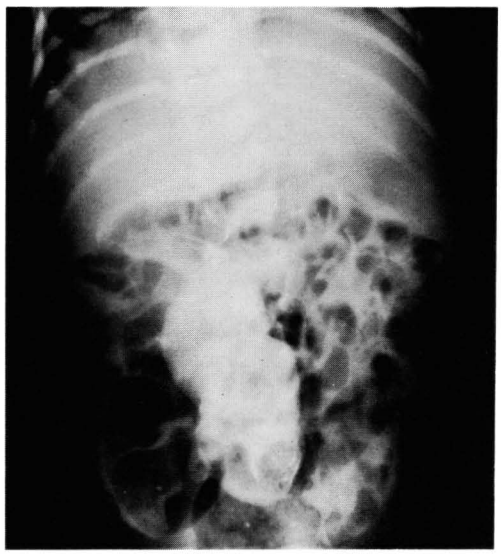

Fig. 1. IVP at 5 minutes shows no visualization on the right kidney. Left kidney is normal. Calcified umbilical cord is seen.

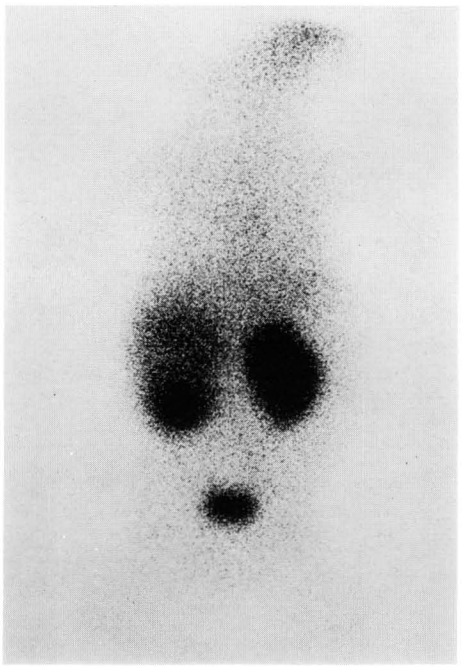

Fig. 2. Renal scintigram with ^{99m}Tc-DMSA reveals abnormal uptake on the right kindey which is larger than the normally appearing counterpart.

Pathological findings: Resected right kidney weighed approximately 58 gm (Fig.3, A). Cut section revealed an approximately 4.5×4.5 cm pale yellowish-white diffuse neoplastic mass occupying nearly all of the right renal substance. Neither hemorrhage nor necrosis was seen. Microscopically predominant pattern was sheets of elongated fusiform cells (Fig. 3, B), which were proved to be leiomyomatous in character by silver staining method (Fig. 3, C). There were neither prominent nuclear pleomorphism nor mitotic activity. Tumor cells were infiltrating into the normally appearing parenchymal cells and demarcation between them was vaguely recognized (Fig. 4, A). Mostly tubules were closely similar to the morphology of normal nephron. On occasion nests and islets of abnormal tubules and glomeruli were seen (Fig. 4, B). These tubules were sometimes cystic and dysplastic or immature. Fur-

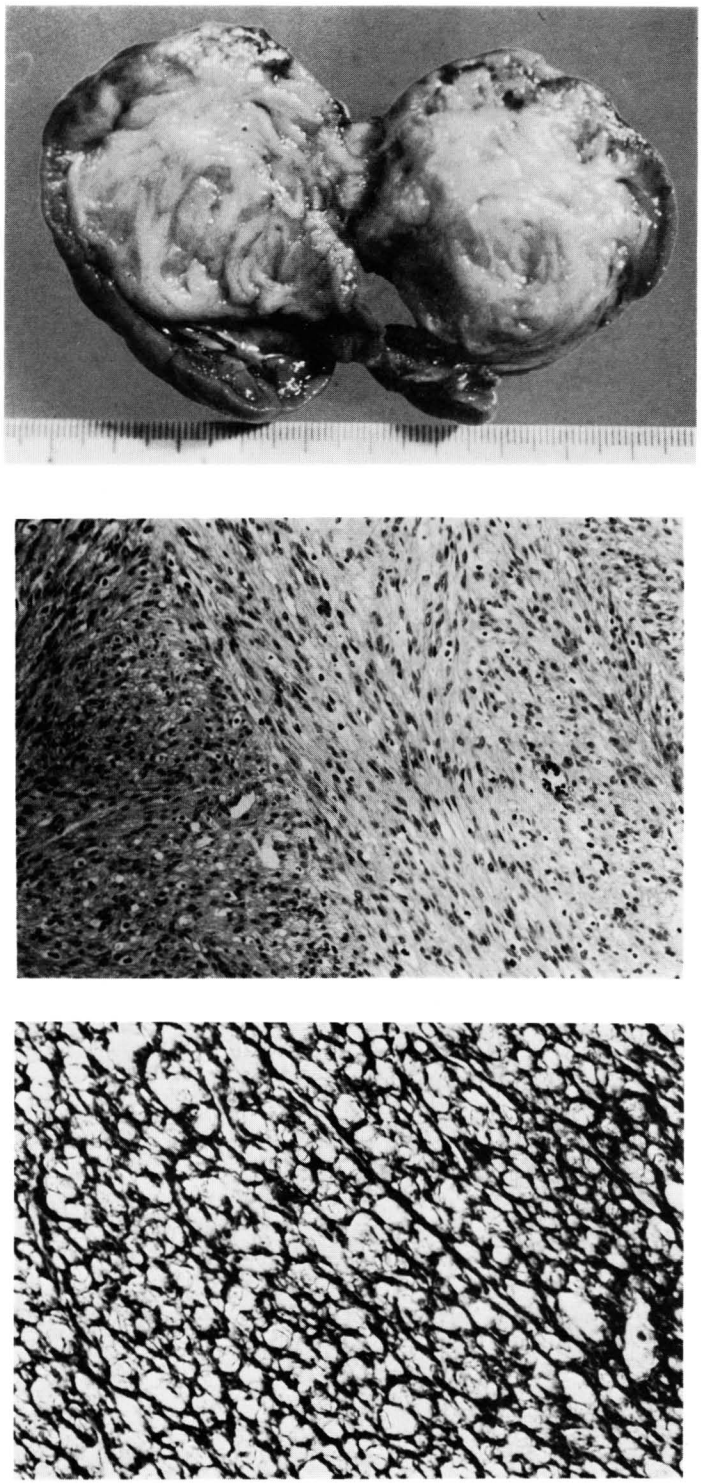

Fig. 3. A, cut section of resected right kindney. B, sheets of elongated fusiform cells are shown, which are main component of neoplastic tissue. Reduced from ×400. C, silver staining method demonstrates "boxing" indicating these fusiform cells as leiomyomatous in character. Reduced from ×400.

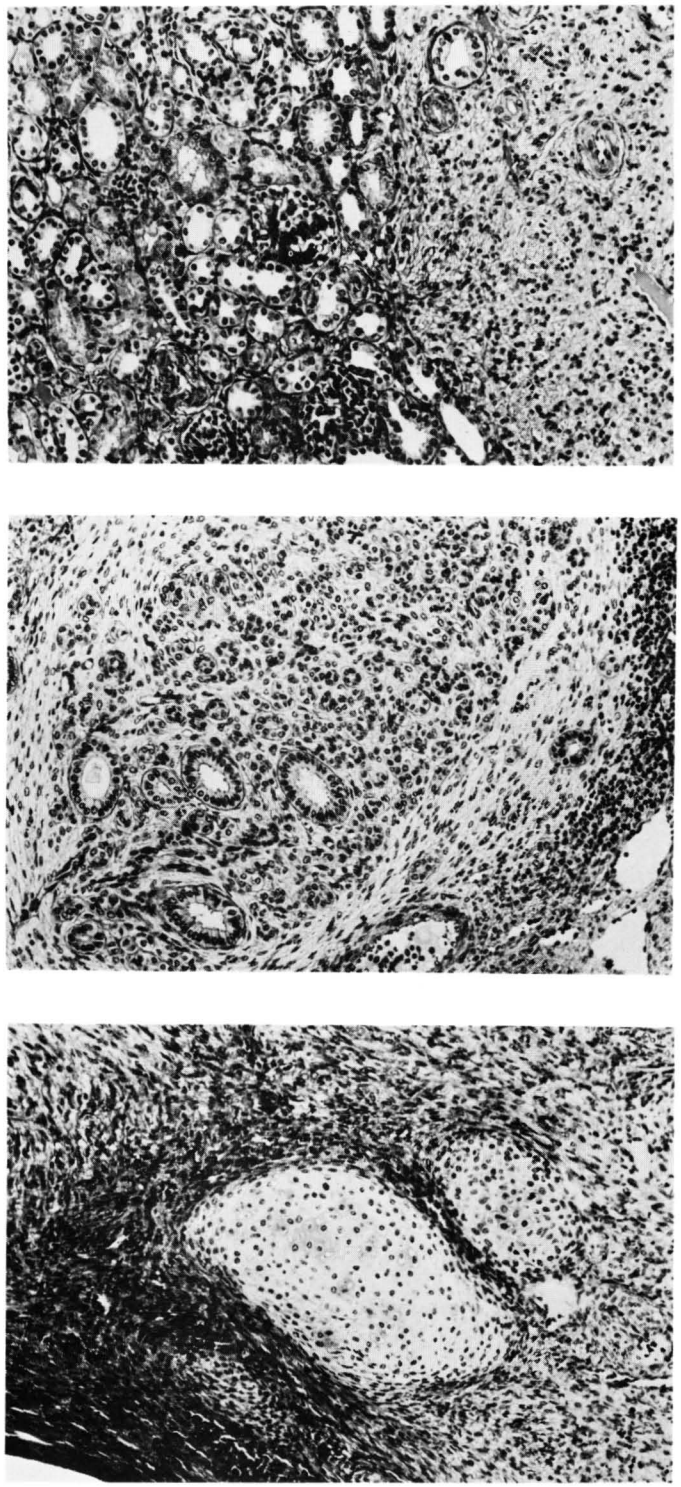

Fig. 4. A, vague demarcation between infiltrating neoplastic cell component and normally appearing parenchymal cell component is seen. Reduced from ×400. B and C, nests and islets of abnormal tubules and cartilages are seen in the main component of neoplastic cells. Reduced from ×400.

thermore there were nests of cartilage, (Fig. 4, C), hematopoietic activity and immature fat cells within the tumor substance.

REVIEW OF LITERATURE

The experience in a newborn with unusual renal tumor prompted us to review the literature relevant to this infantile renal neoplasia. We could collect and analyze 79 and 12 cases compatible with the definition of congenital mesoblastic nephroma in English[1~9] and Japanese[10~11] literature, respectively (Tables 1 to 8). Of 79 cases in the English literature, 48 cases, including 8 cases of his own, were collected by Bolande from the literature since 1921[12]. In these earlier literature, however, there were sparse descriptions regarding the characteristics of congenital mesoblastic nephroma.

Sex: Generally male was slightly predominant in English literature as well as in Japanese cases in the ratio of approximately 2 to 1. As shown in Table 1 there was no remarkable predilection for sex distribution.

Race: Like nephroblastoma[13], it may be safely said that the incidence of this tumor is everywhere in the world regardless of the racial origin, climate or environment (Table 2). However, it is not yet determined whether the rate of incidence is related to the racial difference.

Age distribution: As shown in Table 3 this peculiar renal tumor occurred in the majority of cases in the infantile period, especially in the newborn period.

Side of involvement: Right kidney was involved slightly more than the left but bilateral congenital mesoblastic nephroma

Tables 1 to 8. Analysis of 91 cases of congenital mesoblastic nephroma of infancy.

Table 1 Sex

	English	Japanese	Total
Male	41	7	48
Female	30	3	33
Unknown	8	2	10

Table 2 Race

	English	Japanese	Total
Caucasian	37	0	37
Negro	7	0	7
Japanese	1	12	13
Others	0	0	0
Unknown	34	0	34

Table 3 Age distribution

	English	Japanese	Total
Stillborn	1	0	1
Premature	3	0	3
Newborn	55	10	65
Less than 1Y	13	1	14
Over 1Y	3	1	4
Unknown	4	0	4

Table 4 Side of involvement

	English	Japanese	Total
Rt	26	7	33
Lt	23	4	27
Bilat	0	0	0
Unknown	30	1	31

Table 5 Weight of resected kidney (gm)

	English	Japanese	Total
Less than 50	1	0	1
50-100	15	2	17
100-200	12	6	18
Over 200	3	1	4
Unknown	48	3	51

Table 6 Birth weight (gm)

	English	Japanese	Total
1000-2000	5	0	5
2000-3000	15	3	18
3000-4000	8	3	11
4000-	1	0	1
Unknown	50	6	56

Table 7 Recurrence

	English	Japanese	Total
Yes	3	0	3
No	76	12	88

Table 8 Other associated findings

	English	Japanese	Total
Polyhydramnios	8	0	8
Abnormal amniotic fluid, redundant umbilical cord & cord around the neck	0	1	1
Large umbilical cord & cord around the neck	0	1	1
Lt hemihypertrophy	0	1	1

has not been reported so far (Table 4).

Weight of resected kidney: All involved kidneys but one weighed over 50 gm (Table 5). This finding is compatible with the description of Bolande and his associates.[1] The involved kidneys were apparently larger and heavier than the size and weight of uninvolved normal kidney in this age group (normal 12 to 20 gm).

Birth weight: As Blank and his associates have pointed in their literature, 1 of the 2 associated features in congenital mesoblastic neophroma is that some of the babies were born prematurely[9]. Table 6 shows the birth weight of patients with congenital mesoblastic nephroma. The incidence of prematurity was relatively remarkble. However there were many cases whose weight at birth were not described in earlier literature.

Recurrence: Bolande collected and analyzed 48 cases of congenital mesoblastic nephroma of infancy including 8 cases of his own and stated that there has been no documented case of tumor recurrence by metastasis[12]. Wigger collected and analyzed 27 cases and he found that all patients except for 5 who died of postoperative complication or chemotherapy were free of either local recurrence or metastasis[2]. Fu and his associates, however, were the first who reported the case with congenital mesoblastic nephroma and its recurrence in 1973[4]. Two other cases of recurrence have been reported to date (Table 7)[5,6]. Though recurrence in congenital mesoblastic nephroma is rare, its presence should be always kept in mind whenever dealing with this neoplasia.

Other associated findings: As stated previously by Blank and his associates, another associated feature in congenital mesoblastic nephroma is that the mothers often had polyhydramnios[9]. There were 8 cases associated with mother's polyhydramnios in the English literature[9,10] but not in Japanese literature (Table 8). However, there were 2 cases with unusual findings related to the umbilical cord in Japanese literature. In one case reported by Todani and his associates there were abnormal amniotic fluid findings without polyhydramnios, and redundant umbilical cord (99 cm in length) with cord around the neck at the time of patient's delivery[10]. Another case we reported herein had large umbilical cord and cord around the neck at the time of patient's delivery.

It is probable that many authors in earlier literature had inadvertently or deliberately missed the perinatal findings which might be one of the useful adjuncts for clinical diagnosis of congenital mesoblastic nephroma.

And lastly, intriguing was the case with left congenital mesoblastic nephroma and ipsilateral hemihypertrophy reported by Ishii and his associates[11]. In this case, group I Wilms' tumor (mesenchymal pattern) was diagnosed at first but congenital mesoblastic nephroma became the final diagnosis after through histopathological examination of the resected kidney was done. The association between Wilms' tumor and hemihypertrophy has been well known but no other case with congenital mesoblastic nephroma associated with hemihypertrophy has been reported to date. If the final diagnosis of the case reported by Ishii and his associates is not incidental, further cases of congenital mesoblastic nephroma associated with hemihypertrophy must be added before this relationship is established firmly.

DISCUSSION

A hamartomatous tumor of the kidney of the infant and the newborn has been called in various names and indeed often, in the past, has been confused with Wilms' tumor. The gradual recognition of this tumor, in spite of its rarity, as a different entity from the Wilms' tumor in its distinct clinical and histopathological features has prompted to describe the literature concerning the specificities and characteristics of this rare entity. However, the confusion as to the diagnosis and its subsequent treatment is sometimes encountered even at the present time[8].

At present there are no characteristic features in radiological and laboratory

examinations which are compatible with congenital mesoblastic nephroma.

However, age at onset and perinatal history may be sometimes useful in making the final diagnosis. As described previously by Blank and his associates, 2 features thought to be associated with congenital mesoblastic nephroma must be contemplated in the clinical diagnosis of congenital mesoblastic nephroma.[9] That is prematurity of the newborn and mother's polyhydramnios at the time of her pregnancy. Other abnormal findings if present at the perinatal period must be carefully weighed whether these are incidental or not before the association between these and congenital mesoblastic nephroma is firmly established. Indeed relationship between abnormalities of amniotic fluid and some congenital renal anomalies has been recognized for many years.[14] At least clinically there is no characteristic and reliable findings indicating the very presence of the congenital mesoblastic nephroma.

Therefore final diagnosis is made only when the careful histopathological examination of the resected kidney is completed. The detailed features of histological characteristics have been described in many literature[1,4,12]. Succinctly it is not encapsulated and on cut section is homogenously rubbery or firm and pale whorled in appearance, resembling a uterine fibroid in character. Hemorrhage and necrosis are generally absent. It is composed predominantly of a fibrous and/or leiomyomatous components, and cystic, dysplastic or immature tubules and glomeruli are irregularly and often inconspicuously scattered. Extrarenal infiltration especially into the perihilar region is not uncommon. In addition nests of cartilage, angiomatoid and hematopoietic patterns are recognized demonstrating the pluripotency of the mesenchymatous substance of the the tumors.

The accurate incidence of this tumor is not yet known, but it is generally agreed that substantial number of cases in the neonatal period are congenital mesoblastic nephroma.

One of the distinct features of congenital mesoblastic nephroma from Wilms' tumor is its benign clinical course and therefore nephrectomy, with careful removal of infiltrated extrarenal portion if present, will suffice. It is thought that postoperative antineoplastic and/or radiation therapy does harm rather than does good to the patient.

With very rare exceptions, no recurrence or metastasis is a rule once the diagnosis of congenital mesoblastic nephroma is established. Up to the present time 3 cases of recurrence were reported in the literature[4~6]. Because there is no longtime follow-up data on patients with congenital mesoblastic nephroma, it is hoped that substantial data on the longtime postoperative course be appeared sooner in the literature. As a conclusion it is recommended when the physician encounters the newborn with renal tumor, he should entertain congenital mesoblastic nephroma as the most probable disease and withhold postoperative antineoplastic and/or radiation therapy until the congenital mesoblastic nephroma is ruled out histopathologically. Once congenital mesoblastic nephroma is diagnosed, nephrectomy alone will suffice but he should follow the patient for fairly a long time to see if the recurrence or metastasis occurs although it is a remote possibility.

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和文抄録

Congenital mesoblastic nephroma：症例報告および文献的考察

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乳児の congenital mesoblastic nephroma は臨床的および病理組織学的な特徴で Wilms 腫瘍と別の疾患であると考えられるようになって10年以上たっている．しかしこの腫瘍はときに Wilms 腫瘍と混乱されるために不用意にも現在でも Wilms 腫瘍のような積極的な治療が行なわれる．われわれは本疾患の文献を考察し，英文および日本語の文献中の91例を解析した．その結果，不適切な術後療法をさけるために切除標本に対して迅速でかつ正確な病理組織学的診断の重要性を述べ，かつ congenital mesoblastic nephroma の特徴を記載した．