

## A Case of Meckel-Gruber Syndrome (Dysencephalia Splanchnocystica)

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**= Abstract =** An autopsy case of Meckel's syndrome in a fetus is described. The brain anomaly was detected on ultrasonography at 15 weeks of gestation and the pregnancy was terminated at the gestation age of 21 weeks. No hereditary pattern was elicited in this case. Multiple congenital anomalies consisted of posterior encephalocele with dysplastic brain, cleft palate and lip without philtrum, postaxial polydactyly and syndactyly, polycystic kidneys of Potter type III, fibrosis and bile duct proliferation of the liver, and interstitial fibrosis of the pancreas and the spleen.

**Key words:** *Meckel's syndrome, Polycystic kidney, Encephalocele, Polydactyly, Cleft palate*

### INTRODUCTION

Meckel-Gruber or Meckel syndrome is a rare lethal disorder that is characterized by varying degree of prenatal growth retardation, posterior encephalocele, postaxial polydactyly and polycystic kidney. Ear anomaly, abnormal external genitalia, hypoplastic philtrum and cleft lip are often associated.

We report an autopsy of a fetus that showed multiple congenital anomalies that could best be designated as Meckel-Gruber syndrome. This particular case showed characteristic changes in the kidneys.

### CASE REPORT

This female fetus was a product of pregnancy termination in a 33 year old mother at 21 weeks of gestation. Meningocele was first diagnosed by ultrasonography at 15 weeks of gestation. Two previous pregnancies of this mother were born with neural tube defects. No history of unusual drugs or of infectious diseases during this pregnancy was elicited.

Postmortem examination was done 24 hours after delivery. The female fetus was accompanied by the placenta. The body weight was 400 grams. The

crown rump length was 18.5 cm and the crown-heel length was 23 cm. The head circumference was 14 cm, chest circumference 18 cm and abdominal circumference 18 cm. The left foot length was 3.5 cm. The head was proportionally small. There was a protruding mass in the superior occipital region at the junction of two parietal bones and the occipital bone. The mass consisted of brain tissue and covering leptomeningeal tissue. This mass was herniated through a round defect of 2 cm in diameter in the bone (Fig. 3). The interpupillary distance was increased and the nose was flat and deformed. There were a left complete cleft palate and cleft lip without philtrum (Fig. 2). The ears were low set and deformed with poorly developed ear lobes and small everted helices. There was postaxial polydactyly of the right hand, syndactyly (4th and 5th fingers) of the left hand and postaxial polydactyly of the left foot. The genitalia were those of female. The anus was patent.

Internal examination of the head showed encephalocele sac measuring 3 × 2 × 2 cm and a bony defect involving the superior portion of the occipital bone as an extension of the posterior fontanel. The defect was fairly round (Fig. 3) and the herniated brain was a portion of parieto-occipital lobe of the brain, that was very friable because of autolysis. However, microscopically dysplastic features were encountered in this area. Remaining

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brain tissue was also friable but was grossly unremarkable. The spinal cord was also normal.

The chest organs showed the heart and the lungs weighing 2.9 grams and 12.5 grams each. The lungs were smaller than that was expected. The thymus weighed 1.0 grams and was unremarkable. The abdominal cavity was slightly protuberant due to two enlarged kidneys, weighing 19.2 grams in the right and 20 gm in the left, and showing diffuse cystic change. Both kidneys maintained their normal contours and measured  $6 \times 3 \times 2.5$  cm in the right and  $7 \times 4 \times 3$  cm in the left. The ureters were small and thin, and connected to the very hypoplastic triangular urinary bladder measuring less than 0.8 cm in maximum extent (Fig. 5). No definite luminal structure could be grossly identified in the ureters and the bladder. Cut sections of the kidneys showed myriads of small cysts mostly of submacroscopic size but occasionally grossly cystic measuring up to 4 mm in diameter. The pelvo-calyceal system was poorly developed microscopically and almost the entire kidney parenchyme was replaced by numerous cysts lined by flat epithelial cells, affecting both the cortex and the medulla. The glomeruli were frequently found amongst cystic tubules which were associated with intervening fibrous tissue. Normal cortical tissue including glomeruli and proximal tubules tended to present along the capsule of the kidney. The walls of the cysts varied in thickness. Some were thin-walled with almost no connective tissue, while some were surrounded by zones of dense fibrotic connective tissue. No areas of dense fibrous mass, cartilage islands or primitive ducts were seen.

The remaining abdominal organs including adrenals, ovaries and intestines were grossly and histologically unremarkable. However, there was a definite increase of fibrous connective tissue in the interstitium of the pancreas and the spleen. The liver showed portal widening due to fibrosis and bile duct proliferation. Extramedullary hemopoiesis was also seen in the liver. Sections of the heart and the lung were unremarkable.

The placenta was round and weighed 100 gms. The diameter was 13 cm. The umbilical cord was 37 cm and the nearest margin of insertion was 5 cm. Cut sections showed no remarkable change. The histology of the placenta was also unremarkable.

## DISCUSSION

The combinations of posterior encephalocele,

cystic kidneys, cleft palate and postaxial polydactyly in this case leave little doubt that this is a case of Meckel's syndrome. We know no more detail on the family history in this case other than the mother had 5 gestations, 2 abortions, 2 premature births and 2 died after birth. This syndrome is known as an autosomal recessive disease (Crawford *et al.* 1978).

Among the changes seen in this case the kidneys appear to be most interesting. In the literature large fibrous walled cysts and primitive ducts are reported to be the most prominent feature in Meckel's syndrome (Crawford *et al.* 1978; Opie and Howe 1969). Metanephric elements are extremely sparse. However, in our case the above-mentioned features were not seen. Instead fairly uniform cystic structures with normal intervening metanephric element were quite important. Indistinct corticomedullary junction was another important finding in this case. These findings along with partial preservation of ampullary activity are compatible with type III cystic disease of kidney (Potter *et al.* 1972). The volume of the cysts increases with age in type III, and they are generally seen more numerous in infants, since at birth many are not large enough to be grossly visible. This anomaly results from irregular inhibition of ampullary function accompanied by secondary involvement of interstitial portions of collecting tubules and nephrons. These cystic kidneys in Meckel's syndrome have seldom been adequately described (Potter 1972). Therefore it is difficult to assess the nature of anomaly of kidneys in Meckel's syndrome. However, this case suggests the possibility of abnormality affecting ampullary function of the developing kidney with the secondary involvement of collecting tubules.

The liver change in this case is a manifestation of cystic disease involving the kidneys. The liver lesion may be an important finding because it is very often seen in Meckel's syndrome. It is characterized by portal tract enlargement and early fibrosis associated with hamartomatous bile-duct proliferation (Case Record of MGH 1983). It is often missed unless one looks for it carefully under the microscope. This change was reminiscent of congenital hepatic fibrosis seen sometimes in type II or IV cystic disease of the kidney.

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= 국문초록 =

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33세 산모에서 21주만에 인공분만된 태아에서 멕켈 증후군의 1 부검증례를 기술하였다. 본예는 임신 15주에 초음파검사로 뇌기형이 발견되어 이를 토대로 중절시킴예로서 부검결과 후두부 뇌류, 구개파열, 뇌의 이형성, 다지증, 합지증 그리고 다낭신 등의 특징적 다발성 기형을 가졌던 예로서 이는 이미 기술된 바 멕켈 증후군의 소견과 일치하였다. 본예는 우리나라에 아직 보고가 없던 본 증후군의 부검예라는 것과 이때 나타난 신장의 낭성변화가 포터 분류법의 제3형에 속한다는 사실이 흥미로워 기술되었다.

LEGENDS FOR FIGURES

- Fig. 1.** Posterior view of the fetus, showing posterior encephalocele, abnormal ears and postaxial polydactyly.

**Fig. 2.** The face shows cleft lip without philtrum and flat nose.

**Fig. 3.** The complete cleft palate of the left side is seen.

**Fig. 4.** Posterior view of the head, showing a round bony defect.

**Fig. 5.** External view of the kidneys and lower urinary system. Note diffusely enlarged kidneys and hypoplastic urinary tract.

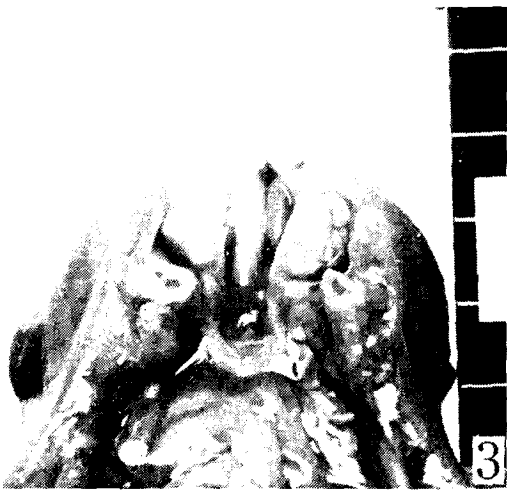
**Fig. 6.** Cut surface of a kidney, showing numerous small cysts distributed in the cortex and the medulla.



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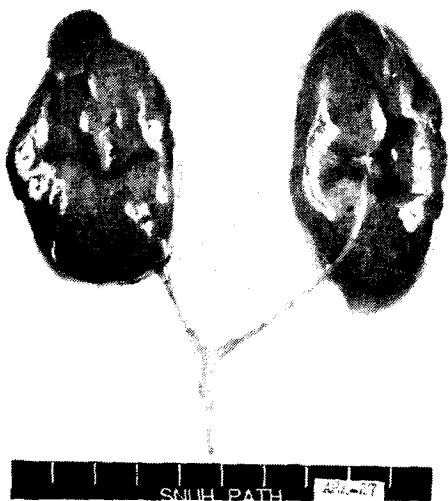
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