Creatinine Equilibrium Between Mother and Nephrectomized Primate Fetus.* (27529)

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Numerous investigations of the exchange of nutrient and metabolic substances between mother and fetus in man and monkeys have been reported(1,2,3). Recent studies(4) have suggested that water, urea and creatinine were excreted by the fetus into the amniotic cavity and returned to the maternal fluids in response to a concentration gradient by passive diffusion across the chorioamnion. Since creatinine appeared to be in equilibrium between the maternal and fetal sera and the concentration significantly elevated in the amniotic fluid, it was further suggested that placental exchange may not be necessary for excretion of endogenous fetal creatinine. These data were interpreted as evidence that amniotic fluid represents a repository for fetal excretory creatinine(4).

The purpose of this report is to measure and compare the concentration of creatinine in fetal and maternal sera 3 and 4 weeks after bilateral nephrectomy in the fetus. Since the pregnant rhesus monkey possesses a placenta very comparable to that of man, this animal was used for this investigation.

Experimental. Two pregnant *Macaca mulatta* monkeys in the last trimester of pregnancy were studied. At laparotomy the intrauterine fetus was manipulated so that its vertebral column was closely applied to the anterior uterine wall. It was maintained in this position by sutures placed through the myometrium, fetal membranes and fetal skin. The uterus and fetal membranes overlying the fetal lumbar spine were then incised without loss of amniotic fluid. The fetal skin was incised, dissected from the underlying muscle and the cut edges sutured to the myometrium (Fig. 1). This permitted excision of the fetal kidneys through bilateral flank incisions. The kidneys were mobilized and the renal pedicles ligated under direct vision (Fig. 2). The fetal skin was then closed with a continuous suture and fetal membranes and myometrium were closed in a single layer with a continuous catgut suture. The abdominal wall was repaired in anatomical layers.

A subsequent laparotomy was carried out 3 and 4 weeks after the nephrectomies. Simultaneous samples of fetal and maternal blood were obtained at the time of cesarean section.

Creatinine determinations were performed by the Benedict and Behre method as modified by Clark and Thompson(5) and readings obtained at a wave length of 510 mμ in a Coleman spectrophotometer.

Results. Creatinine concentrations in maternal and fetal sera are listed in Table I. In the first experiment (Monkey #1) these values were obtained 21 days post nephrectomy. Monkey #2 was studied 28 days post nephrectomy. The elapsed time between fetal nephrectomy and the study period should have been sufficient to allow for some accumulation of creatinine in the fetal circulation if, as has been implied by McGaughey, the placenta is not an important pathway for clearance of fetal creatinine.

Although generalizations from one species to another regarding placental function should be avoided, the demonstrated similarities in concentrations of creatinine in pregnant monkeys and humans (Table II) would suggest that a comparison of this aspect of fetal catabolism would be valid.

TABLE I. Creatinine Concentration in Maternal and Fetal Sera After Fetal Nephrectomy.
Creatinine Conc. mg %

	Maternal	Fetal
Monkey 1 (21 days post Nephrectomy)	.80	.75
Monkey 2 (28 days post Nephrectomy)	.90	1.00

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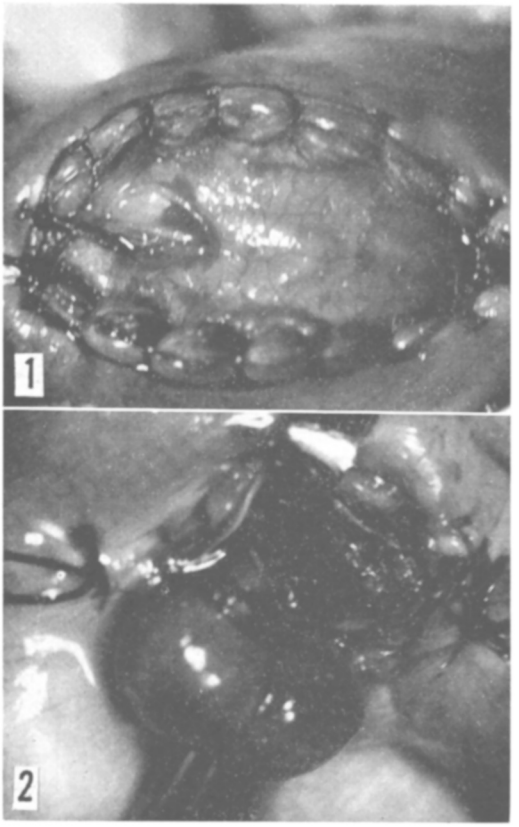

FIG. 1. Illustration of the manner in which fetal skin is sutured to fetal membranes and uterine wall to exclude the amnionic cavity from the operative site in the fetus.

FIG. 2. Mobilization and excision of the fetal kidney.

TABLE II. Creatinine Concentration in Maternal and Fetal Sera of Normal Humans and Monkeys. Creatinine Conc. mg %

	Maternal	Fetal
Man*	.99 (35)	1.02 (23)
Monkeys	1.05 (4)	.98 (4)

* McGaughey *et al.* (*Am. J. Obst. & Gynec.*, v80, 108, 1960)

( ) No. of samples.

Summary and conclusions. 1. Concentrations of creatinine in maternal and fetal sera of the monkey are within the range considered normal for pregnant humans. 2. Concentrations of creatinine in maternal and fetal sera remain in equilibrium and within this normal range 3 and 4 weeks after bilateral fetal nephrectomy. 3. It is not necessary to postulate renal excretion of creatinine into the amniotic fluid and subsequent absorption or diffusion by the chorioamniotic membrane to account for creatinine equilibrium between fetus and mother. 4. It is suggested that the placenta, rather than the fetal kidneys, is important in maintaining the composition of fetal serum.

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Intestinal Absorption of 5,6-Dimethylbenzimidazolyl Cobamide Coenzyme in the Rat.* (27530)

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Since the discovery of the coenzyme of vit. B_{12}(1,2), much interest has been aroused as to whether or not previous information obtained with cyanocobalamin is applicable to the metabolism of this naturally occurring

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