

used for the grafting. Of 20 dogs surviving the operation, 12 died in from 3 to 21 days, and the rest were sacrificed between the 4th and the 27th weeks following the operation. Gross and microscopic studies of the biliary system of the latter 8 dogs disclosed that, in

all, the transplanted segment of the uterine horn connected the common bile duct and the duodenum without causing permanent severe damage to the biliary system.

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17275. Observations on Experimental Aortic Anastomosis.

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(Introduced by J. C. Hinsey.)

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The following report is based on observations made upon 3 dogs that were subjected to end-to-end anastomosis of the thoracic aorta at the age of 6 weeks and then studied approximately one year after operation.

Method of Study. Six young dogs, male and female litter mates, were subjected to division of the aorta and end-to-end anastomosis at the site of division at ages between 6 and 8 weeks. A seventh male dog was op-

erated on in a similar manner at the age of 3 weeks. The operations were performed under intravenous nembutal anesthesia and endotracheal insufflation. The anastomosis was accomplished with a single continuous evert-ing mattress suture of No. 00000 arterial silk attached to an atraumatic needle.

Four of these dogs died 22 to 42 days after operation from intestinal infestation. Autopsy in each case revealed the

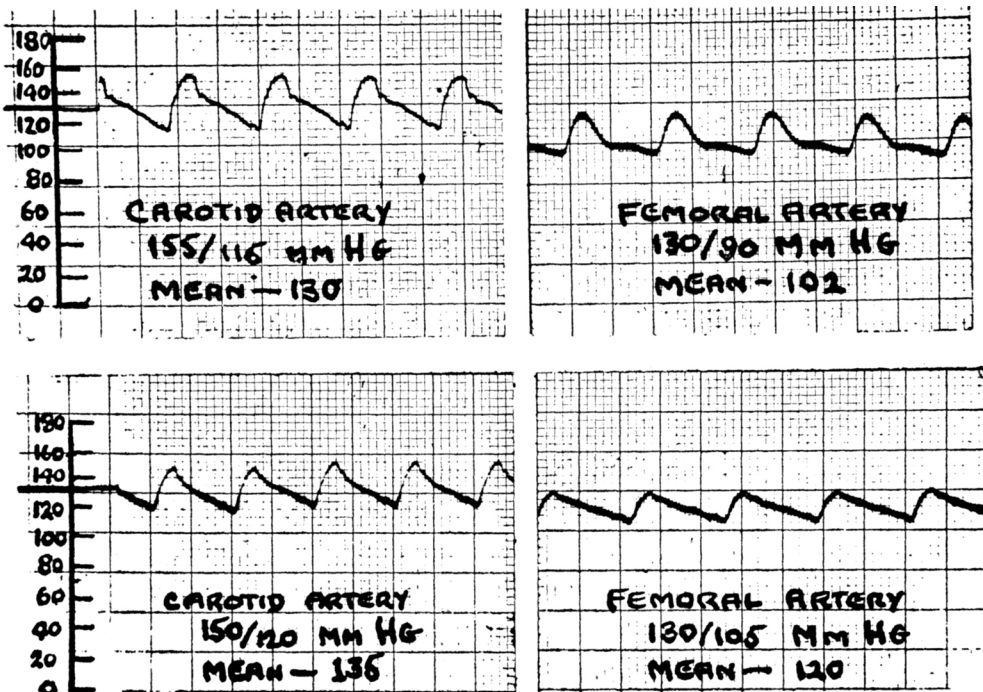


FIG. 1.

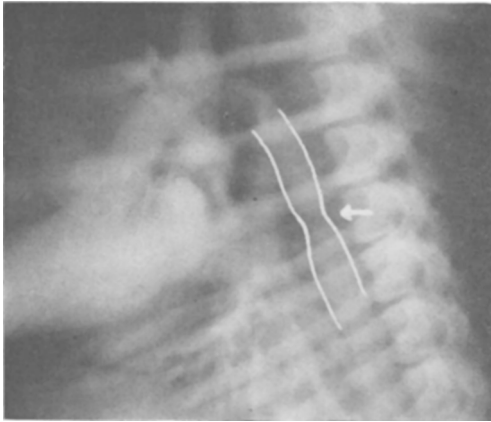


FIG. 2.

Dog 795. Angiocardiogram obtained with 16 cc of neo-iopax. (Retouched).

Femoral pulses were palpable in all 3 animals and blood pressure recordings were obtained with a Sanborn electromanometer in the carotid and femoral arteries of 2 of the dogs. (Fig. 1 and Table I)

Eleven days after angiocardiography, the male dog was subjected to thoracotomy and the site of anastomosis removed. The specimen was submitted to the Department of Surgical Pathology where sections were made longitudinally through the site of anastomosis for microscopic study.

Analysis. Angiocardiographic studies demonstrated in each animal a definite narrowing at the site of anastomosis. (Fig. 2, 3, 4) In one there appeared to be a slight dilation of the aortic arch (Fig. 3); however, there was

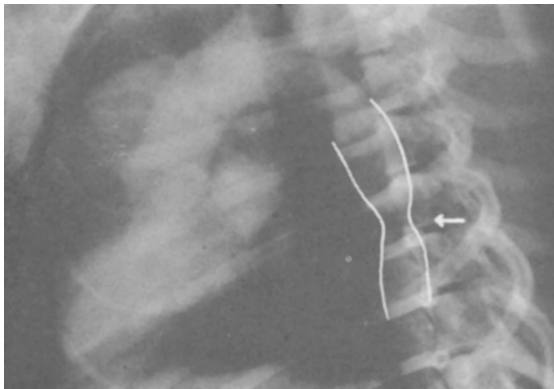


FIG. 3 (left). Dog 797. Angiocardiogram, using 10 cc of 70% diodrast, shows narrowing of thoracic aorta at site of anastomosis. There appears to be some dilatation of the arch of the aorta. (Retouched).

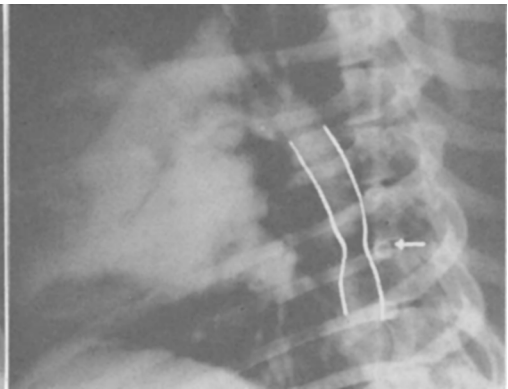


FIG. 4 (right). Dog 798. Angiocardiogram showing slight constriction of thoracic aorta. 14 cc of neo-iopax was used for contrast substance. (Retouched).

suture line to be intact and without evidence of mural thrombosis. The 3 remaining dogs, one male and 2 females, developed normally and at the time of these investigations weighed 28, 34, 34½ lb respectively.

Approximately one year after operation, angiocardiographic studies were made. Under intravenous sodium pentobarbital anesthesia, the left external jugular vein was cannulated. Fourteen to 16 cc of neo-iopax was given rapidly through the cannula in 2 cases, and 10 cc of diodrast in the third. Roentgenograms were obtained at 0.5 sec. intervals throughout the cardiac cycle until the thoracic aorta had been visualized.

no evidence of aneurysmal dilation either above or below the narrow area. There was no suggestion of compensatory collateral circulation in any case.

In the dog subjected to thoracotomy, the area of constriction was readily visualized (Fig. 4). The diameter of the aorta was approximately the same above and below the site of stenosis. It also appeared that the lumen of the anastomotic site was larger than the lumen of the aorta had been when the dogs were 6 weeks of age. The silk suture was still present. (Fig. 5)

Microscopic examination of the resected segment of aorta revealed an intimal prolifera-

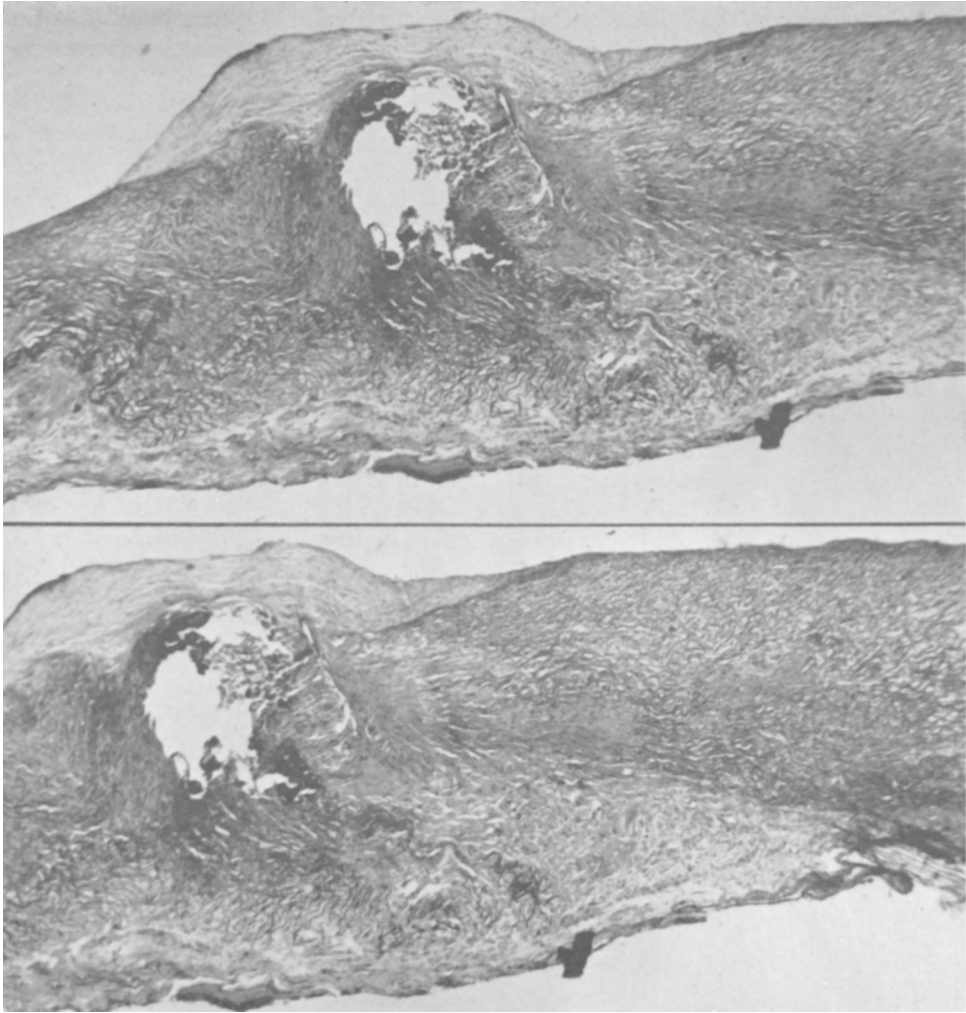


FIG. 5.

Photomicrograph of segment of aorta removed from dog 795. Longitudinal section through the site of anastomosis. In the upper photograph the site of suture is shown in the center of the photograph, the intimal surface being on the superior surface of the section. In the lower photograph the section has been moved to the left in order to show the adjacent aortic wall.

tion at the suture line but atheromatous changes were absent. (Fig. 5) Foreign body reaction was apparent immediately adjacent to the silk suture and there was scarring at the junction. The aortic wall to either side, however, was well preserved. Elastic tissue stains showed good preservation of the media.

Discussion. Interest in surgical intervention of coarctation of the aorta has been active since the report by Crafoord and Nylin¹

of successful excision of the involved segment of aorta and anastomosis. Because the average age at death of 74% of the people afflicted with this congenital lesion has been shown to be 30 years,² it is felt that operation should be performed before maturity. In addition, atheromatous changes in the aorta occur early in association with this malformation and accordingly it is technically advantageous to undertake operation at a relatively early age before such changes take place.

¹ Crafoord, C., and Nylin, G., *J. Thoracic Surg.*, 1945, **14**, 347.

² Gross, R. E., *J.A.M.A.*, 1949, **139**, 285.

The first case reported by Gross was a 5-year-old boy³ and, in discussing his experience with 60 cases recently, whose ages ranged from 5 to 30 years, he stated that operation should be avoided before 6 to 8 years of age.² Gross indicated that the risks in babies and very young children are high³ because collateral channels are not well developed and because the aorta is too small for the anastomosis to be accomplished with facility. He stated further than "an aortic lumen may be established at the anastomosis which is satisfactory for a child of a few years of age, but it will probably be insufficient in size when the person grows to maturity."

The experiments reported in this paper appear to have some bearing on the latter two points. There may be some doubt as to the necessity of delaying operation until a child is 6 to 8 years old to assure that the aorta will be large enough to suture without excessive risk. The dogs in this experiment were under 5 lb in weight and less than 8 weeks old at the time of operation, and yet the technical aspects of the anastomoses were

accomplished without mishap. The 4 fatalities in the postoperative period were unrelated to the operative procedures.

On the other hand, it would appear that the diameter of the lumen at the site of anastomosis in these dogs did not keep pace in growth with the rest of the aorta. This would support the view that surgical intervention for coarctation should be deferred until the lumen of the aorta is large enough in diameter to insure adequate size as the individual grows to maturity. To be sure, a single continuous suture was used for the anastomosis which might have some bearing on the formation of the constriction.

Summary. Seven young dogs between the ages of three and eight weeks were subjected to end-to-end anastomosis of the thoracic aorta. Three of these dogs survived and have been studied approximately one year after operation to determine the status of the site of anastomosis.

Narrowing of the aortic lumen at the suture line was demonstrated in each animal by angiocardigraphic methods and also in one at thoracotomy.

³ Gross, R. E., *Surgery*, 1945, **13**, 673.

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17276. Isolation of an Anti-thyroid Compound from Rape Seed (*Brassica Napus*).

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In a study of the toxic reactions produced in rats by phenylthiourea and α -naphthylthiourea (ANTU), it was found that rats which had been pretreated with anti-thyroid compounds or fed on certain goitrogenic diets developed a marked resistance to these toxic compounds.¹ This effect has been used as an assay method in the extraction of a goitrogenic compound from rape seed.

Materials and methods. Adult Sprague-Dawley rats of either sex were used in assay-

ing the rape seed fractions. Crude fractions were tested by mixing them with the normal diet of fox chow and feeding for 4 days, following which the rats were injected intraperitoneally with 30 mg/kg of phenylthiourea. More refined fractions were dissolved in water and given in a single subcutaneous injection, followed 24 hours later by 20 mg/kg of phenylthiourea intraperitoneally. Survival of the rats for more than 48 hours after the toxic dose was used as the criterion of activity in the extracts.

The normal LD 50 of phenylthiourea for

¹ Carroll, K. K., and Noble, R. L., *Fed. Proc.*, 1949, **8**, 22.