bolic acid. This provokes some adhesions which serve in a measure to prevent lung collapse when the second stage of the operation is carried out two or three weeks later for the purpose of irradiating the valves.

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Viability of the intestine.

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The margin of safety has not been definitely determined concerning circulatory changes in a segment of intestine as the result of injury, thrombosis, embolism or mechanical intestinal obstruction. The work of Rydigier[1] closely followed by that of Madelung[2] showed that it was impossible to establish any definite rule as to which vessels of the mesentery of the small intestine could be ligated without danger of gangrene. The experiments of Mall and Welch[3] brought out the fact that necrosis occurred if much more than 5 cm. of intestine were separated from its blood vessels.

This report is based upon the observations in twenty-four dogs. The circulation to an intestinal segment in each experiment was interfered with by ligation of various vessels in different portions of the intestine. The results obtained were as follows:

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1 Rydigier, L., *Berl. klin. Woch.*, 1881, xviii, 593; *und Deut. Z. Chir.*, 1884, xxi, 546.

2 Madelung, O., *Arch. klin. Chir.*, 1882, xxvii, 227.

3 Mall and Welch, *Albutt's System of Medicine*, 1902, vi, 239.

No. of Experiment	Duration of life	Location and Vessels Ligated	Pathology†
		Duodenum	
54*	11 days	5 contiguous terminals	Deep congestion central portion—return of circulation to ends of segment.
212*	31 days	2 contiguous terminals	Circulation returned to involved segment.
221*	58 days	3 contiguous terminals	Circulation returned to involved segment.
		Jejunum and Ileum	
8*	13 days	Cecal branch ileo-colic	Circulation returned to involved segment.
4*	13 days	1 first arcade	Circulation returned to involved segment.
18-A*	21 days	2 alternating second arcade	Circulation returned to involved segment.
20*	21 days	3 contiguous second arcade	Circulation returned to involved segment.
1*	13 days	3 contiguous terminals	Circulation returned to involved segment.
11*	10 days	3 alternating terminals	Circulation returned to involved segment.
6	24 hrs.	1 intestinal	Segment gangrenous, no perforation.
10	24 hrs.	1 intestinal	Segment gangrenous, no perforation.
18	36 hrs.	1 intestinal	Segment gangrenous, perforated.
56	10 days	3 contiguous first arcade	Segment gangrenous, no perforation.
215	84 hrs.	8 contiguous terminals	Segment gangrenous, perforated.
		Colon	
55*	6 mos.	3 alternating terminals	Circulation returned to involved segment.
223	60 hrs.	Middle colic	Segment gangrenous, perforated.
224	204 hrs.	5 contiguous terminals	Segment gangrenous, no perforation.
225	108 hrs.	5 contiguous terminals	Segment gangrenous, perforated.

From the data herein presented it appears that the circulation returns to a segment of gut when three contiguous vessels are tied, or when the cecal branch of the ileo-colic is tied, or after other experimental ligations, as represented in table. The circulation, however, does not return when the main artery is ligated, or more than one vessel of the first arcade, or more than four contiguous terminal arteries.

* Euthanasia.

†Adhesions in all experiments.

Variables 16, 17-A, 19, 214, 226, 227, not included in this series, owing to twisting of segment producing a mechanical obstruction and peritonitis not the result of the experimental pathology.