# SCLEROSING OR RETRACTILE MESENTERITIS*†

## ITS TREATMENT AND THAT OF ADHESIONS WITH THE ELECTROSURGICAL KNIFE

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THICKENING and shortening of the mesentery, with great distention of the lymphatics in the involved mesentery and bowel, were observed when we ligated in continuity all the vessels, artery, vein and lymphatics, to a small segment of bowel. The same result occurred when the lymphatics to the segment were ligated. The ligations were made in the region of the second and third branching. The bowel itself showed very little alteration except possibly a little thickening.

This retraction and thickening of the mesentery reminded us of certain clinical cases, infrequently seen, in which certain areas of the mesentery were found thickened and retracted.

In the paper by Reichert and Mathes[1] on experimental lymphedema of the intestinal tract and its relation to regional cicatrizing enteritis, Case 3 (M. P.) was that of a man who had suffered a severe blow on the abdomen from the steering wheel of an automobile. He was operated upon two months later for intestinal obstruction. An area of ileum was found bound down and kinked. The mesentery was very short, boggy and thick. At one point in its root, a small mass of dark colored material, either fecal matter or old, unabsorbed blood pigment, was found. Resection of the involved bowel and mesentery cured the condition. The pathologic study of the resected ileum showed chronic ileitis with the submucosa greatly thickened and edematous. The lacteals between the muscular layers were greatly engorged and many were thrombosed.

Another patient (M. H.), a boy, age 14, two years before entry had had acute appendicitis with possible rupture. Appendicectomy with drainage was performed at another hospital. He remained well until two months before admission, when his first and only attack of cramps, in the right lower quadrant, and soreness developed. Hot stupes and manipulation of the abdominal wall with the patient in the knee-chest position relieved the pain. A diagnosis of intra-abdominal adhesions was made. At operation omental adhesions to the cecum and terminal ileum were freed with the electrosurgical knife. A fibrous band, 3 Mm. thick and 4 cm. long, extending from ileac wall to terminal ileac wall, so arched the bowel that a loop of intestine could easily slip between and cause obstruction. The terminal ileum was narrowed and angulated by fibrous contracture of the mesentery. The regions with narrowing, angulation and

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contracture were released by lightly coagulating the scar tissue and letting it pull apart. The bowel wall was somewhat thickened, probably from the scarring and retraction of the mesentery with lymphatic block, rather than being a true regional ileitis.

We reviewed the work of Welch and Mall[2] on hemorrhagic infarction but could find only an occasional mention of the lymphatics and none of mesenteric retraction among their many beautiful experiments.

Our search in the modern text-books of surgery revealed no mention of retractile mesenteritis, *per se,* although great thickening of the mesentery was discussed under the recently described condition of regional enteritis.

In Volume 4 of Keen's System of Surgery, 1908, Van Hook and Kanavel describe contraction of the mesentery and quote the observations of O. Brehm,[3] who felt that mesenteric shrinking was not only to be regarded as an etiologic factor in volvulus of the sigmoid but also as a disease, *sui generis,* which demanded treatment. He felt that simple detorsion of angulated loops did not suffice in mesenteric contraction and that radical resection was necessary.

A number of papers on retractile mesenteritis have appeared in foreign literature during the past ten years. In Bonorino's article[4] on sclerotic and retractile mesenteritis he gave credit to Virchow[5] for describing scirrhotic mesenteritis of the sigmoid flexure, in 1853. Virchow believed that a circumscribed peritonitis with cellulitis and sclerosing degeneration in the mesentery caused its retraction, this retraction being necessary in the production of volvulus of the pelvic colon.

Subsequent to the appearance of Virchow's paper, authors have reported one or more cases of retractile mesenteritis. Tuberculosis by some, trauma by others, was considered to be the causal agent. In reviewing the case reports in the literature and those collected by Bonorino up to the year 1929, we did not feel that the descriptions were entirely similar to the condition now considered as regional enteritis.

Apparently the first experimental work on retractile mesenteritis was reported in 1927 by Jura[6] who, by injecting bacteria from the intestinal flora into the mesentery of the ileum, produced a lymphangitis and subsequent retractile mesenteritis.

Stropeni,[7] in 1933, from experiments on dogs, stated that when the mesenteric veins were ligated or injected, mesenteritis developed. He did not find any disturbance when the artery was ligated. No animals showed any infiltration of lymphatics and he concluded that trauma produced mesenteritis by interference with veins.

Milone and Picco,[8, 9] in a preliminary note in 1933, and a complete report in 1935, discussed in detail the many and varied theories in the literature as to the etiology of retractile mesenteritis. They believed that disturbance of lymphatics caused retraction of the mesentery because absorption from the intestines was greater in lymphatics than in veins, and lymphatics were more

readily disturbed. In their experiments on rabbits they tied off the lymphatic trunks at the root of the mesentery without injuring the arteries and veins. Histologic study, one to 60 days after operation, showed that retractile mesenteritis did not develop until about the tenth day, and that the changes produced by blocking lymphatics passed through the following three stages: Diffuse edema of the mesentery with mobilization of migratory elements, especially the histocytes, first occurred. This was followed by hyperplasia of the connective tissue from new fibroblastic proliferation—at first fibrillary, then circumscribed in bundles and bands perpendicular to the direction of the lymphatics. The third stage consisted of sclerosing of newly formed connective tissue bundles and cords with gradual replacement by collagen fibers and eventual retraction of the mesentery. They concluded that the cause of mesenteritis was of intestinal origin; that it was linked with the intestinal substances or attenuated organisms of undetermined nature which penetrated the intestine through the veins or lymphatics, or were held in them in a relatively higher concentration by obstacles causing obstruction, such as hematoma after trauma, inflammation or neoplasm.

Thus in the experimental work of Jura, Stropeni, and Milone and Picco, retractile mesenteritis was produced by mesenteric inflammation from bacteria, or from ligating mesenteric veins or lymphatics. It was not produced by ligation of the mesenteric artery.

This previous experimental work on mesenteritis seemed inconclusive since the components of the circulatory system in the mesentery had not been studied in the same animal individually and collectively. From our earlier work on lymphedema[1] we knew of the fibrosis and scarring that developed when the lymphatic system was blocked in the bowel and in the mesentery, but we did not emphasize this finding since small amounts of the sclerosing solution leaking into the mesentery from the punctured lymphatics might have been a factor in causing the retraction.

*Experimental Investigation.*—The experiments we are now reporting concern circulatory imbalance in the canine mesentery. They can be divided into seven parts, namely, the effect produced by (1) ligating all structures, artery, vein, nerve and lymphatics, in a segment of the mesentery proximal or distal to the second branching from the root of the mesentery; (2) ligation at this level of the artery and vein; (3) ligation at this level of the lymphatics; (4) ligation at this level of the artery; (5) ligation at this level of the vein; (6) the formation at this level of hematoma in the mesentery; and (7) trauma to the mesentery.

Early in the experimentation it was realized that a number of factors must be controlled if the results were to be interpreted as being due only to the experimental procedure. Study of the protocols of the first two animals showed the necessity of assistance during the operation and of the utmost care in handling the bowel. Perhaps the greatest factor to interfere with the estimation of results was adhesions which developed when small amounts of

blood soiled the abdominal contents, or when all the talc on the gloves had not been washed off. Adhesions also developed after frequent sponging with moist gauze or when drying of the exposed bowel and mesentery occurred. As the investigation progressed it became evident that the proper treatment of adhesions was another interesting problem which will be discussed later. Photographs were taken at the operating table when reopening the animals for observations, since the alterations could not be seen well in the sacrificed animal. But the photography had to be abandoned as the drying of the exposed bowel by photo-flood lamps produced adhesions.

A summary of the experiments is given in Table I. In a single animal three to eight different ligations have been performed at stated points in the mesentery of the small bowel. Between ligations normal or control segments of mesentery intervened. When no alteration in the mesentery was found at exploration, one to eight weeks later it was indicated as o in the table. Shortening and thickening of the mesentery was indicated as + in the table.

It will not be necessary to give the protocols of each animal, but that of Dog 11 will suffice to outline the procedure and present the findings.

TABLE I

EXPERIMENTS ON PRODUCTION OF RETRACTILE MESENTERITIS AND ITS TREATMENT

| Dog | Lymphatics Ligated | All Vessels Ligated | Artery Ligated | Vein Ligated | Artery and Vein Ligated | Hematoma | Hematoma + Irritation | Irritation | All Vessels Ligated at Root | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 1..... | + | o | | + | o | | | | | |
| 2..... | o? | o? | o? | o? | | | | | | |
| 3..... | +? | + | | o | | | | | | |
| 4..... | | + | o | o | o | | | | + | |
| 5..... | + | + | o | | | | | | | |
| 6..... | | + | o | | o | | | | | |
| 7..... | o | + | o | | | | | | | |
| 8..... | o | + | o | o | o | o | | | o | |
| 9..... | + | + | o | o | o | o | | | o | Electrosurgical. ꝶ. No reformation |
| 10..... | + | | +? | o | o | | | | | |
| 11..... | + | + | o | o | o | o | | | + | |
| 12..... | | Died 10 hrs. p.o. | | | | | | | | |
| 13..... | ? | ? | ? | ? | | | | | | Loops of bowel matted together |
| 14..... | | | | | | | | + | | Electrosurgical. ꝶ. No reformation. |
| 15..... | | | | | | | | + | | Electrosurgical. ꝶ. No reformation |
| 16..... | | | | | | | | + | | |
| 17..... | + | | | | | | | o | | Electrosurgical. ꝶ. No reformation |
| 18..... | | + | | | | | o | o | | |
| 19..... | + | + | | | | | + | | | Scissors. ꝶ. More extensive reformation |
| 20..... | | | | | | | | + | | Scissors. ꝶ. More extensive reformation |
| 21..... | | | | | | | | + | | Scissors. ꝶ. Reformation |
| 22..... | | | | | | | | + | | Scissors. ꝶ. Reformation |

+ Shortening and thickening of segment of mesentery. o No change. ? Adhesions obscured observations.

**Protocol of Dog 11.**—This adult female had the following experiments started, November 7, 1938:

(1) On November 7, 1938, all vessels, artery, vein and lymphatics, proximal to the third branching of a segment of the mesentery were ligated together, in continuity, with black silk. On November 18, 1938, at exploration, retraction and thickening of the mesentery was found (Fig. 1 [I]). There were no adhesions.

(2) After leaving an adjacent normal segment of mesentery as a control, a hematoma, 2 cm. in diameter, was produced between the leaves of the mesentery at the third branching by needling the vein. On November 18, 1938, the hematoma had been absorbed and no change was found in the mesentery (Fig. 1 [II]).

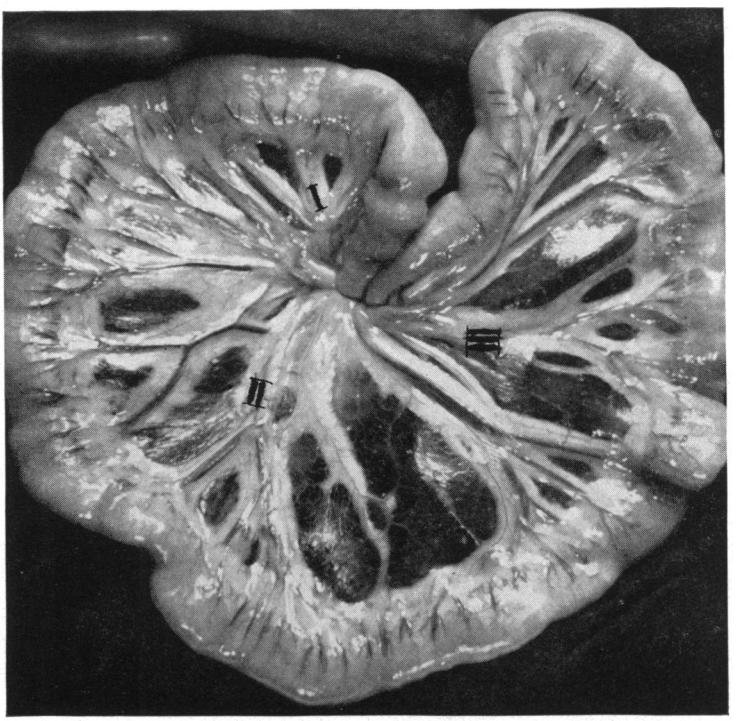


FIG. 1.—Dog 11: Photographs of ligated regions of mesentery 11 days after operation. (I) All vessels ligated in continuity producing retraction of segment of mesentery. (II) Mesenteric hematoma absorbed and no alterations in mesentery noted. (III) Artery and vein ligated but no alteration in mesentery seen.

(3) An adjacent portion of the mesentery was left for control and then the artery and vein at the third branching were ligated together in continuity. On November 18, 1938, no change was observed in the mesentery or bowel (Fig. 1 [III]).

(4) After another control segment of mesentery was left, the artery, vein and lymphatics were ligated together in continuity at the third branching. On November 18, 1938, shortening and thickening of the mesentery and slight thickening of the bowel were found (Fig. 2 [IV]).

(5) After leaving an intervening control segment of mesentery the lymphatics only were ligated in continuity at the third branching. A note was made that the accompanying artery and vein were not constricted. On November 18, 1938, slight but definite retraction of the mesentery was observed (Fig. 2 [V]).

(6) The vein was ligated at the third branching after leaving a segment of mesentery as a control. On November 18, 1938, no change was noted in the mesentery (Fig. 2 [VI]).

(7) The lymphatics only were ligated at the first branching after leaving a segment of mesentery as a control. The accompanying artery and vein were patent. On November 18, 1938, thickening and retraction of the mesentery and thickening of the bowel wall were found (Fig. 2 [VII]).

(8) A segment of mesentery was left as a control and then the artery alone was ligated at the second branching near the terminal ileum. A small hemorrhage in the mesentery occurred at the time

of ligation. On November 18, 1938, the hemorrhage had been absorbed and no alteration was noted in the mesentery. A small omental adhesion was found on the bowel near this region.

The animal was sacrificed, January 20, 1939, at which time many omental adhesions to the small bowel were found. They probably were caused by exposure and drying of the bowel and mesentery during photography.

*Summary of Experimental Results.*—The experimental findings in 22 animals may be followed in Table I.

The lymphatics in a segment of the mesentery were ligated in 11 experiments. In seven, there was definite shortening and thickening of the mesentery and one showed dilated lymphatics but no retraction.

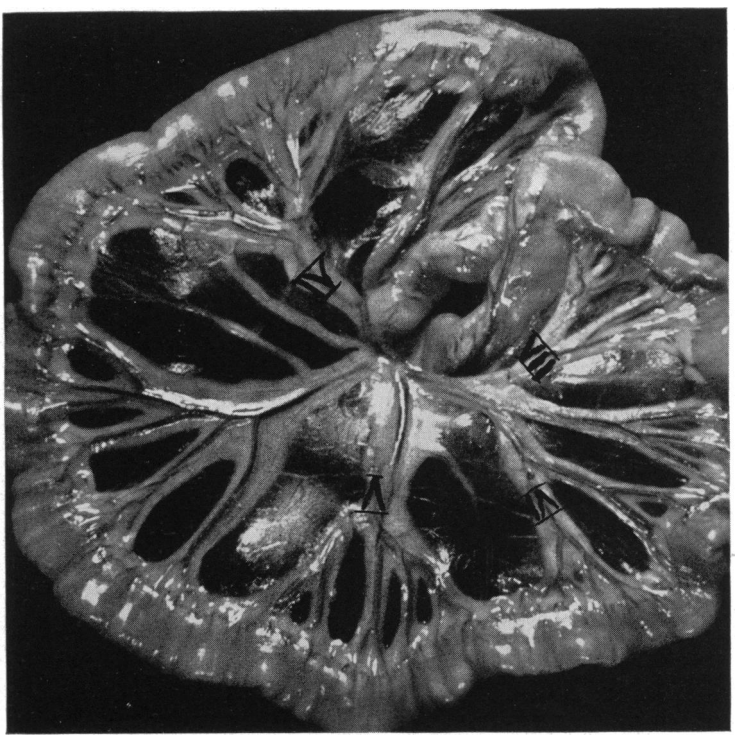


FIG. 2.—Dog 11: Ligated regions of mesentery 11 days after operation. (IV) All vessels ligated producing retraction and thickening of the mesentery. (V) Some retraction occurred after ligation of lymphatics alone. (VI) No change seen after ligation of the vein. (VII) Retraction of mesentery and slight thickening of bowel after ligation of lymphatics at second branching.

All vessels—artery, vein and lymphatics—in a segment of the mesentery were ligated in 12 experiments. In ten, definite retraction of the mesentery occurred.

When only the artery was ligated, no retraction occurred in eight experiments. In one, a questionable shortening of the mesentery was seen beneath an omental adhesion.

When only the vein was ligated, no change in the mesentery was noted in seven experiments. In one, the mesentery was thickened and the omentum was adherent to the site of the ligation.

Hematomata were produced in the mesentery in three experiments but no retraction occurred. In two other experiments, in which a hematoma was produced and the mesentery overlying the hematoma was rubbed with gauze, one showed retraction of the mesentery. All hematomata were quickly absorbed.

When the mesentery was irritated with talc from gloves or by rubbing it with gauze, retraction occurred six times in eight such experiments. Ligation of all vessels at the root of a segment of mesentery produced retraction twice in four experiments.

We, therefore, found that retractile mesenteritis could be produced consistently when all vessels in a segment of the mesentery near the third branching were ligated. Usually, it could be obtained when the lymphatics alone were ligated or when the mesentery had been irritated or traumatized. It did not occur when the artery or the vein, or when both artery and vein, were ligated. Hematomata in the mesentery were absorbed and produced no retraction.

We agree with Milone and Picco[8, 9] that the lymphatic stasis plays an important part in the production of retraction of the mesentery.

Careful histologic study of the mesentery and bowel in Dogs 8, 9, 17 and 19 confirmed, in general, the findings of Milone and Picco. In the later stages, that is, two or more months after ligation, we found an increase of fibroblasts and elastic tissue fibers just beneath the serosa, where they formed an irregular sheet from which long fibrous strands extended interiorly. Around some of the mesenteric vessels the van Giesson stain showed a slight increase of fibroblasts. This fibrosis, limited to the outer or superficial part of the mesentery, produced the retraction. No definite alteration was seen in the deeper areolar and fatty portion of the mesentery. In some experiments, where all vessels in a segment of mesentery were ligated, the bowel showed slight thickening, with dilation of the lacteals and edema in the musculature.

*Treatment of Retractile Mesenteritis.*—The older writers advised radical resection for retractile mesenteritis, and this seemed the only feasible procedure when the condition was extensive with angulation of the bowel, such as was found in our first case.

In our experiments, and in our second case, where the retraction was moderate and the bowel in good condition, satisfactory treatment consisted of dividing adhesions and freeing the scarred contracted mesentery with the electrosurgical knife.

Clinically, we have preferred the division of adhesions after the method of Trowbridge[10] who, in 1929, advised treating them with the electrosurgical knife.

In seeking proper treatment for retractile mesenteritis in animals, this method of Trowbridge's seemed to be advantageous as compared with the customary freeing of scars and adhesions with the scalpel or scissors.

Although this comparison in the treatment of retractile mesenteritis and

of adhesions was made in only eight experiments, definite conclusions could not be drawn at this time since we had not compared the two methods in the same animal.

Treatment by division with the scalpel or scissors of omental and mesenteric adhesions and of retractile mesenteritis was employed in four animals. No attempt was made to peritonize the raw surfaces. Subsequent explorations showed, in all four animals, reformation of adhesions and more retraction of the mesentery. In two, the adhesions were more extensive after this form of treatment.

Employment of the electrosurgical knife, set for slow coagulation, was used to separate and free omental and mesenteric adhesions and retractile mesenteritis in four other animals. Separation was made with ease by keeping the adherent areas under slight tension. Subsequent exploration showed that the adhesions had not reformed in the cauterized areas, and the sclerosed mesentery showed no or only slight retraction.

**Protocol of Dog 9.**—An adult female, the following are the findings after the use of the electrosurgical knife to separate adherent areas.

(1) On October 26, 1938, all vessels were ligated in continuity in a segment of the mesentery at the third branch. On November 3, 1938, the mesentery was found retracted. There were no adhesions. On December 5, 1938, the fine mesenteric scars were separated by electrocoagulation. On December 12, 1938, no adhesions and no retraction was found. On January 20, 1939, no adhesions and no retraction was seen.

(2) On October 26, 1938, the lymphatics only were ligated in a segment of mesentery. On November 3, 1938, the mesentery was found shortened and thickened with dilated lymphatics on the surface of the involved bowel. No adhesions were present. On December 5, 1938, both sides of the contracted mesentery were touched lightly with the electrosurgical knife. On December 12, 1938, and January 20, 1939, no retraction had recurred and there were no adhesions.

(3) On October 26, 1938, the artery alone was ligated at the third branching. On November 3, 1938, no changes were found. On December 5, 1938, small collateral arterial vessels had developed around the point of ligation. On December 12, 1938, and January 20, 1939, no further changes had occurred.

(4) On October 26, 1938, the vein was ligated at the third branch. On November 3, December 5, and 12, 1938, and January 20, 1939, no changes were seen.

(5) On October 26, 1938, the artery and vein were ligated together. On November 3, December 5, and 12, 1938, and January 20, 1939, no alterations were noted.

(6) On October 26, 1938, a hematoma, about 2 cm. in diameter, was produced between the third and fourth branchings. On November 3, 1938, slight infiltration and discoloration was noted. On December 5, 1938, this region appeared to be normal and continued so when observed, December 12, 1938, and January 20, 1939.

(7) On October 26, 1938, three hematomata were produced between the fourth and fifth branchings near the mesenteric attachment to the bowel. On November 3, December 5, and 12, 1938, and January 20, 1939, the area appeared to be normal.

(8) On October, 26, 1938, all vessels at the second branching were ligated. On November 3, 1938, there was no retraction, but lace-like opaque areas were seen on the mesentery. On December 5, 1938, scars were divided with the electrosurgical knife. On December 12, 1938, and January 20, 1939, a slight decrease in amount of scarring was noted.

*Comments on Protocol of Dog 9.*—At the first operation extreme care was taken in handling the bowel and in keeping it moistened with warm normal saline. Gauze was applied only once to the mesentery to control oozing at the site of a hematoma. On December 5, 1938, at the third operation in the region where the fourth, fifth and sixth ligations were made, a large omental adhesion was attached to the bowel wall for a distance of three inches. This adhesion was freed from the bowel by electrocoagulation (Fig. 3). In

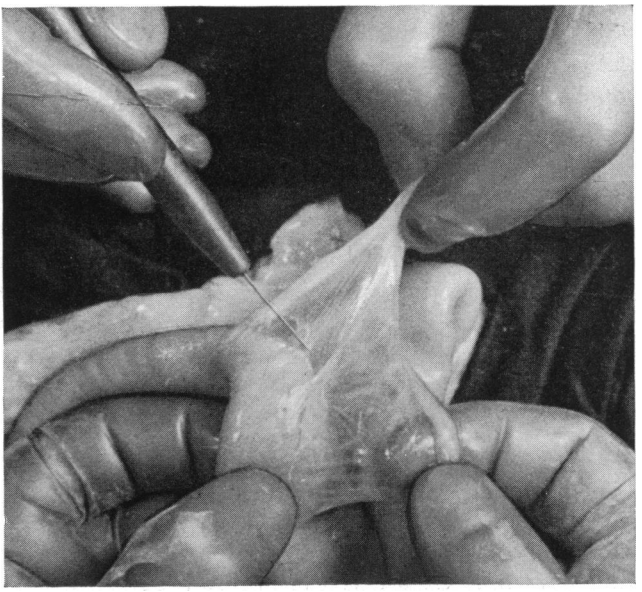

FIG. 3.—Dog 9: Shows division of adhesions with electrosurgical knife.

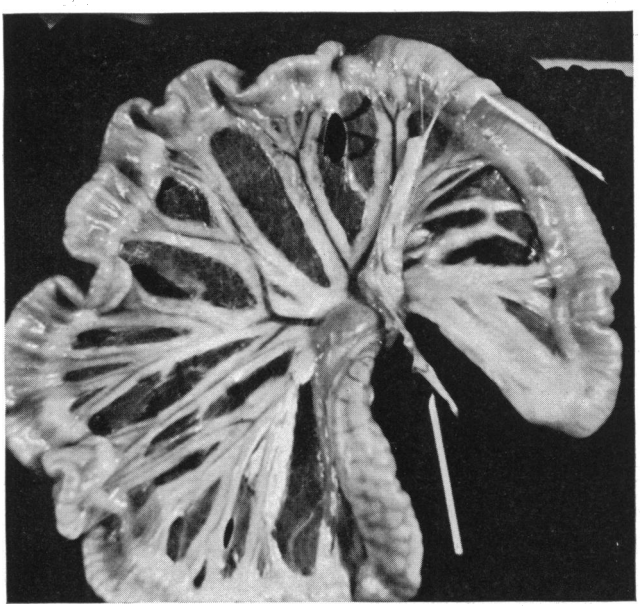

FIG. 4.—Dog 9, January 20, 1939: Upper indicator lies over normal bowel to which omentum had been adherent, Bowel freed from omentum with the electrosurgical knife one month previously. A new omental adhesion had developed to normal adjacent bowel. The lower indicator points to a free strand of omentum which had been freed from the mesentery one month before by means of the electrosurgical knife.

order to identify the areas divided, a black silk tie with ends 5 mm. long was placed on the bowel where the omentum was freed. Another similar tie was fastened to the omental stump. The same treatment and similar identification marks were applied to another small omental adhesion attached to a small area of mesentery. On December 12, 1938, at the fourth operation, the small bowel showed slight scarification of the serosa over the area freed from the omental adhesion. A pencil-like strand of omentum was attached to the black tie on the bowel. Another end of omentum had attached itself to the black tie on the mesentery where the other adhesions had been freed. This formation of adhesions to the knot area has just been described in the experiments of Donaldson and Cameron.[11] On January 20, 1939, the abdomen was opened and observation and photographs made. Wherever electrocoagulation had been used no adhesions were found. Where the retracted mesentery had likewise been freed, scarring was present but no retraction persisted. The only indications of electrocoagulation were several small yellowish scars in the serosa. The area of bowel to which the omentum had been adherent showed no adhesion or scarification, and is indicated in Figure 4 by the match-stick on the bowel. One new adhesion had formed near this area on normal bowel, probably from trauma and exposure. The other match-stick points to a free omental tag previously separated from the mesentery by electrocoagulation.

Although these experiments on the treatment of mild retractile mesenteritis and of adhesions are not conclusive, they at least suggest that electrosurgical division of adhesions is far superior to the customary division with scalpel or scissors. Apparently division by coagulation leaves dead tissue on the exposed surface with healing occurring beneath before separation of the scar. This would prevent new points of adhesion.

## CONCLUSIONS

Retractile mesenteritis is no longer mentioned in the modern text-books of surgery.

Retraction of the mesentery is discussed in texts, as occurring in the recently described condition of regional enteritis.

One of our cases with retractile mesenteritis has been reported as a case of regional enteritis. The other case also might be considered as a mild instance of regional enteritis.

European investigators have reported experiments in which retractile mesenteritis was produced by mesenteric inflammation from bacteria, or by ligating mesenteric veins or lymphatics.

We found that retractile mesenteritis could be produced consistently when all vessels in a segment of the mesentery were ligated. Usually it could be developed when the lymphatics alone were ligated or when the mesenteric leaves had been irritated or traumatized.

Our experiments indicated that lymphatic stasis played an important part in the production of retraction of the mesentery, since it did not occur when the artery and vein, or each alone, were ligated.

Since mild degrees of retractile mesenteritis were produced experimentally, radical resection was not considered as the proper treatment.

In the treatment of experimental retractile mesenteritis and intra-abdominal adhesions, the electrosurgical knife was found to be superior to the customary division with scissors or scalpel.

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DISCUSSION.—DR. JOHN HOMANS (Boston): Doctor Reichert's skill with the fine needle has led him into a field into which very few of us are able to follow. He was able experimentally, for instance, to reproduce, in a very practical way, what seems to have been a regional enteritis, and not satisfied with that, he has refined his experiment and produced chronic thickening in the mesentery by what seem to be impossibly simple means.

In that respect, it is rather interesting to speculate upon why lymphatics behave in this way, and that is my excuse for discussing this paper, for I know nothing whatever about the cicatrizing changes in the mesentery. I take it that most of us would notice them if our eyes were open to them, but apparently we have not taken much note of them.

If lymphatics are divided on a large scale, as in experiments which Doctor Reichert performed years ago, and the whole leg is encircled by an incision, they find no difficulty in crossing the scar, but apparently they are very subject to disorganization for other reasons. If, for instance, one plugs up the lymphatics over a considerable area, they appear to go to pieces and the tissues which they drain tend to become first edematous and then indurated by the formation of new tissue.

Doctor Homans then showed a drawing made from a roentgenogram, taken following the injection of lipiodol, demonstrating the veins of the dog's leg, with the lymphatics outlined in black. One could see, at a point behind the knee, a lymph node with a large number of entering vessels, and at a

point nearer the body, a place where one ought to be able to interrupt most of the large lymphatics.

A second roentgenogram was shown of an animal whose principal lymph vessels had been tied off. Perhaps ten days or a week afterward, the animal was given thoratrast in its paw, which demonstrated the lymphatics, which appeared to be quite orderly vessels of rather large size.

Apparently, with time, these obstructed vessels dilate, losing the use of their effective valves, which was demonstrated by a roentgenogram taken some four or five weeks afterward, in which one could see traces of the thoratrast and perhaps the remains of the larger vessels, as if they were dilated and had succeeded in absorbing only a very little thoratrast.

Doctor Homans took this to indicate that once the lymphatics have been interrupted and have been unable to reform, they tend to become disorganized, and perhaps that is the reason why, for anatomic reasons, of which we know very little, in certain parts of the body, possibly because of the presence of terminal vessels, quite remarkable effects can be produced by division of these vessels.

Of course the by-product of this investigation was perhaps as interesting a part of it as any, namely, that the division of adhesions by the coagulating current was a very efficient way of dealing with intraperitoneal bands.

DR. ARNOLD SCHWYZER (St. Paul, Minn.): I was impressed when I heard that simple ligation of the lymphatics in the mesentery causes retractile mesenteritis. We all have seen in cases of appendicitis in the lowest ileum loop now and then a marked retraction of the mesentery, but where is the origin of a regional ileitis or a retractile mesenteritis farther up? That could be a problem.

I saw two cases which might give a clue, and that is why I rose. The two cases, one a very recent one, were of acute appendictis, and in both instances was found a large abscessed node at the root of the mesentery. Now, you would expect that these nodes would be located right at the ileocolic junction, but nothing of the kind. There was no direct connection between the appendix and the abscessed nodes, which in one case was in the midline above the promontory. In the second case, it was even a little to the left of the midline. I suppose that the whole area of lymphatics was affected and over the lumbar vertebrae some mechanical damage was added, which caused a breaking down of a node with abscess formation.

In this way, one can think that even farther up on the ileum an appendiceal infection may be the primary cause of a regional ileitis and retractile mesenteritis.

DR. MARTIN B. TINKER (Ithaca, N. Y.): I would like to discuss electrosurgery in abdominal cases. There must be several here who attended the symposium at the College of Surgeons in Philadelphia some five or six years ago, at which the question of electrosurgery was discussed and its advantages were brought forward. It seems that the men who have profited most by using electrosurgery have been interested in neurologic surgery, and who, with Cushing's lead, have used it very extensively.

I have been impressed, however, with its value in abdominal conditions, such as Doctor Reichert mentioned. Three patients who came in with recurrent intestinal obstruction had been operated upon two and three times before, without permanent results, the obstruction recurring. It seemed that the more favorable results following electrosurgery in freeing adhesions in these cases was the factor that gave permanent results. In several cases they have remained well two and three years following operation, or longer, where

recurrence had followed promptly previously. Doctor Reichert's experimental studies confirm and explain clinical experience.

DR. JOHN A. WOLFER (Chicago): I believe we all recognize that the lymphatic system, especially as it exists in the mesentery of the bowel, is a very complex one. I believe it has been proven by a number of men that if dyes or opaque materials are injected into a segment of bowel or its mesentery, and the lymphatics in the immediate zone are obstructed, that the opaque materials take a rather circuitous route and eventually arrive in the main lymphatic channels or nodes proximal to the site of obstruction. I am wondering if the fact that there is a very rich collateral lymphatic circulation in the mesentery was taken into consideration in arriving at conclusions.

DR. F. L. REICHERT (San Francisco): I wish to thank the members for their discussion and to answer Doctor Wolfer's question. The amount of bowel involved in a ligation usually was between two and three inches, and from our previous work we felt that this degree of involvement took in all of the lymphatics of that part. Of course there is anastomosis on either side. That also developed when we ligated all of the structures in that region.