

BRIEF COMMUNICATIONS AND CASE REPORTS

RETROGRADE JEJUNOGASTRIC INTUSSUSCEPTION THROUGH A GASTRO-ENTEROSTOMY STOMA*

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JEJUNAL intussusception through a gastro-enterostomy stoma is one of the rarer sequelae of the common operation for the relief of peptic ulcer, only 36 such instances having been reported in medical literature to date, including five in American publications.^{1, 2, 3} Only four of the 36 were correctly diagnosed before operation, and in two of these the diagnosis was suggested to the physician by the patient, because of previous similar attacks with surgical intervention and cure. Of 37 cases (including ours), 28 were treated surgically, with 19 recoveries. Diagnosis in the nine unoperated patients was established at necropsy.

Bettman and Baldwin,¹ in 1933, were able to find 33 cases in an exhaustive review of the literature; two additional cases have been described by Adams,² and one by Chesterman.³ Bettman and Baldwin, in their résumé, noted the following facts:

(a) The accident occurred as early as one year and as late as 16 years after the performance of the gastro-enterostomy.

(b) The size of the stoma bore no apparent relation to the incidence of the intussusception.

(c) The length of jejunal segment telescoped into the stomach varied from 5 to 200 cm., the average being 52 cm.

(d) The efferent loop was always involved; the afferent loop seldom.

(e) In only one case was the stomach examined fluoroscopically after ingestion of an opaque meal; in this instance the correct diagnosis was not made.

Case Report.—W. H., white, male, age 57, had had a gastro-enterostomy performed in 1920 for the relief of "ulcers," with complete symptomatic relief. He had no further complaints referable to the gastro-intestinal tract until September 5, 1935, when he was suddenly seized with epigastric colic of rapidly increasing severity, soon associated with retching emesis. The latter was clear at first, becoming blood tinged after about 18 hours; no clots or frank blood was noted.

On admission to the hospital, the patient was moribund and extremely dehydrated, with almost constant retching and hematemesis. Temperature 102° F., pulse 136, respiration 30. There was pronounced abdominal rigidity. No tumor masses were palpable. The blood count showed erythrocytes 6,080,000, leukocytes 18,000, with 83 per cent polymorphonuclears. The clinical picture suggested a perforated ulcer with peritonitis, the hematemesis being ascribed to trauma at the ulcer site from the pernicious vomiting. Sup-

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portive treatment failed to improve the patient's condition, and death ensued 30 hours after admission.

Necropsy revealed an early bronchopneumonia and moderate arteriosclerosis. The stomach was somewhat fixed by adhesions about the pyloric segment, and contained a sausage shaped tumor, which proved to be a loop of jejunum telescoped into the stomach through a posterior gastro-enterostomy opening, and which had undergone partial digestion. The loop involved the first 65 cm. of the efferent jejunal segment without implication of the afferent portion. The stoma measured 10.6 cm. in circumference. There

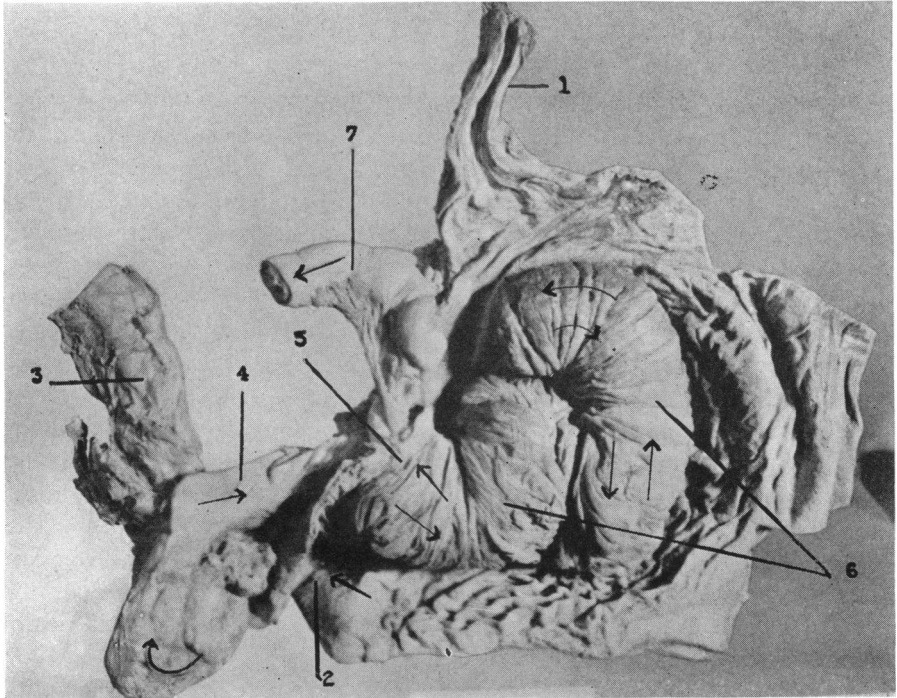


FIG. 1.—Dorsal view of specimen at necropsy. The posterior stomach wall has been cut away; the pancreas has been retracted lateral and twisted upon itself, to show the terminal duodenum entering the involved area. The directional arrows indicate the course of the intestine caudad from the pylorus. (1) Esophagus; (2) pylorus; (3) tail of pancreas, retracted lateral and upward; (4) third portion of duodenum; (5) site of stoma; (6) telescoped loop of jejunum filling stomach; (7) efferent jejunal loop.

was no evidence of active peptic ulcer, malignancy or peritonitis. A healed ulcer was found on the posterior wall of the duodenal cap. The vomited blood had come from eroded vessels of the digesting loop of intestine.

COMMENT.—The above case is being reported, not only because of its interest as a pathologic curiosity, but also because the paucity of reported cases by American clinicians suggests the need of a greater familiarity with this condition on the part of both internist and surgeon. In Chesterman's case, a correct diagnosis of retrograde jejuno gastric intussusception was made on the following criteria:

(1) The occurrence of acute epigastric colic in a gastro-enterostomized patient who had been symptom free from the date of his operation until the onset of the present illness.

(2) Repeated emesis of small amounts of blood intimately admixed with gastric secretions and with practically no clotted particles.

(3) Epigastric tumor without rigidity, fever, or leukocytosis, and with only local tenderness.

Chesterman stresses the diagnostic importance of this sequence of events, emphasizing the fact that colic is not a symptom of bleeding ulcer. In our case, the terminal condition of the patient on admission obscured the clinical picture, but the history was typically that outlined above.

SUMMARY

A case of retrograde jejuno gastric intussusception is added to the series of 36 previously reported.

The syndrome of acute epigastric colic in an enterostomized patient, repeated hematemesis, and epigastric tumor without rigidity, is strongly suggestive of this condition.

Retrograde jejuno gastric intussusception should be included in that group of unusual conditions to which the diagnostician frequently finds it necessary to refer during the study of a difficult case.

REFERENCES

- ¹ Bettman, R. B., and Baldwin, R. S.: J. A. M. A., 100, 1228-1229.
- ² Adams, A. W.: Brit. M. J., 1, 248, February, 1935.
- ³ Chesterman, J. T.: Brit. J. Surg., 21, 541.

SACRAL CHORDOMA*

ONE YEAR AFTER RADICAL EXCISION

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NEW YORK

Case Report.—An American born female, age 63, first consulted me March 15, 1934, for pain and swelling in the right buttock. Her family history was irrelevant. Past History.—She had had a perineal repair 36 years ago; appendectomy 13 years ago; and a hemorrhoidectomy three years ago. The present illness dated from a fall down a flight of stairs six years before, when she struck the lower end of her spine. Following this accident she states it was painful for her to sit down or put any weight on this region. Two years later she again slipped and fell down the same staircase, injuring the same region. Three months before she first consulted me she noticed a swelling in the right buttock and adjacent sacral region, and during the few months prior to her visit to me she had constant pain in this region. Roentgenograms revealed a destructive lesion of the lower end of the sacrum and proximal segment of the coccyx, which presented a moth eaten appearance with no evidence of repair or bone production. The appearance was suggestive of a neoplasm. An aspiration biopsy was performed. Pathologic report by Dr. Fred Stewart of the Memorial Hospital: "Aspiration yielded many small cells incorporated in a mucinous base. In the midst of the small cells are rather pale vacuolated cells, which are consistent with a diagnosis of chordoma."

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Because of the unfavorable results following surgery in most of the reported cases of Chordoma, the patient was referred to Dr. Wm. G. Herrman, the radiologist, of Asbury Park, N. J., with the suggestion that irradiation therapy be attempted. During the following year Doctor Herrman treated the patient with high voltage roentgen ray given as follows: In late March and early April, 1934, she received a series of fractional treatments, using two portals anterior and one posterior; the two anterior directed at the tumor, and the posterior given directly over it, giving a total of 1,594 r units to each portal. In July, 1934, a smaller series was given, a total of 855 r units anteriorly and 824 posteriorly, using two portals, the anterior being directly opposite the posterior. One year later Doctor Herrman again referred the patient to me because of the steady increase in the size of the tumor and constant pain, which was not relieved by irradiation therapy.

Examination March 12, 1935, showed that there had been a tremendous increase in the size of the tumor since the previous examination. There was now a large, firm swelling extending from a point close to the tuberosity of the ischium across to the outer aspect of the posterior part of the buttock. It was only slightly movable. Rectal examination did not reveal any encroachment into the pelvis. The bulk of the tumor and the fact that it made sitting down almost impossible, together with the failure of irradiation to hold it in check or to relieve symptoms, prompted me to advise an attempt at surgical removal, particularly since recent stereoscopic films still showed the area of bone destruction confined to the fourth and fifth sacral segments and the coccyx.

She was admitted to the Ruptured and Crippled Hospital March 19, 1935, where laboratory studies showed normal blood sugar and blood urea. The red blood cells were 4,300,000; hemoglobin 74 per cent; white blood cells 5,850; polymorphonuclears 64 per cent; lymphocytes 36 per cent. Urine was negative except for a very faint trace of albumin. Blood pressure: 180/75. On March 21, 1935, under avertin anesthesia supplemented with nitrous oxide-oxygen, an incision was made extending from the left side of the sacrum across the midline to the right side and down the right gluteal region to the gluteal fold, a distance of some 25 cm. Through this incision the sacrum was exposed and divided through the fourth sacral segment with a chisel, the line of division being palpably proximal to the upper limit of involvement. The anterior surface of the sacrum was freed of areolar tissue overlying the rectum which was separated without damage. The dissection was then carried down along the gluteal region so that the entire tumor was eventually excised en masse and the wound closed. A small rubber dam drain was inserted which extended down to the dead space adjacent to the rectum which could not be completely obliterated when the skin over the sacral area was approximated.

Pathologic Examination.—March 21, 1935. The old sections showed a tumor composed of large islands of a substance resembling a typical hyaline cartilage. These islands are walled off by trabeculae of dense fibrous tissue. The cartilage is atypical in that many of the component cells are vacuolated and resemble the "signet ring" cells with an eccentric peripheral flattened nucleus. In the more recent sections the same picture is seen. Vacuolization of two or more cells is noted in certain areas, giving a pseudoglandular appearance. The histologic picture seems identical with that of the sacrococcygeal chordoma as described by Stewart, Ewing and others. *Diagnosis.*—Chordoma.

The wound healed satisfactorily without infection. The drains were shortened on the second postoperative day and removed on the fifth. Discharged on the twenty-second day.

The patient has returned for examination at frequent intervals and at no time has she complained of any of her previous symptoms. There was some irritability of the bladder, with urinary frequency, during her stay in the hospital, but this rapidly subsided. She has no difficulty in controlling her bladder and rectum. At each examina-

tion a slight bulging at the site of the removed lower sacral segment was noted when the patient coughed, but there has been no increase in the degree of this bulging, noticed either by the patient or by the examiner. She has been able to do her housework.

Roentgenograms taken following the operation showed a smooth stump of the sacrum at the site of the removal and no evidence of pathologic bone in the remainder of the sacrum or the base of the pelvis or lumbar spine. There are no complaints of sensory disturbances.

While remnants of the chorda dorsalis, a specific embryonal tissue about which the vertebral column develops, are regularly found in the intervertebral disks in infants, it has been shown that they commonly persist at the base of the skull and in the coccyx. Virchow first described the small tumors originating from this tissue as "ecchordosis spheno-occipitalis."

The sacrococcygeal chordoma varies considerably in its gross anatomy. Occasionally this tumor grows forward into the pelvis, where it causes interference with bladder and rectal function, and pain from erosion of bone and infiltration and pressure on nerves. When, as in the case reported, the tumors grow outward, very large masses may appear outside the sacrum. The growth is slow, Stewart placing the duration of sacral chordomata at six and one-half years. Of 15 cases which survived operation, 13 soon developed recurrence, and he found only two cases surviving operation three and five years respectively. Chordoma simulates closely two much more common tumors, *i.e.*, myxochondroma and colloid carcinoma of the intestinal canal. In a case of the latter type it may be extremely difficult to distinguish it from gelatinous carcinoma of the rectum. Local recurrence, however, is the rule and a fatal termination is usual.

Doctor Pool, in 1924, presented a case of sacrococcygeal chordoma before the New York Society. In his case a palliative operation was followed by roentgen therapy and use of radium emanation placed in the wound, with regression noted in the size of the tumor. The patient was shown two and one-half years after the operation. Dr. John F. Erdmann, in discussing this case, cited his experience based upon three cases.

Mabrey, in 1935, collected 150 cases. He credits Wood with first reporting in America, in 1913, a case of sacrococcygeal chordoma. He is unable to account for the delayed onset of these cases, for the greatest incidence occurs in the fifth and sixth decades, and states that it is twice as common in men as in women.

In the sacrococcygeal group, Mabrey's figures of 36 deaths with 16 autopsies and ten metastases, 62.5 per cent, would tend to refute the accepted belief that metastases seldom occur. He concludes that treatment in the sacrococcygeal cases is surgical, whenever possible. While surgical removal is so frequently unsuccessful, irradiation is also of little value as these tumors—are one would expect from their histologic nature—are radioresistant.

This case is shown to illustrate a manner in which total resection of the fourth and fifth sacral segments, together with removal of the bulky soft

part extension en masse, was apparently undertaken without unfavorable sequelae. At present the patient presents no evidence of recurrence.

DISCUSSION.—DR. JOHN H. GARLOCK (New York) stated that Doctor Pool's case was alive and well three and one-half years ago, which was ten years after the palliative operation.

DR. BYRON STOOKEY (New York) reiterated Doctor Coley's statement that chordoma occurs at either end of the vertebral column, in the sphenoid or in the sacral region. Differential diagnosis when the tumor is in the sphenoidal region is seldom possible until after operation, at which the conditions are found to be rather hopeless since it is not possible to remove the tumor and only palliative procedures can be employed. In the sacral region, disastrous results may certainly occur in attempting to remove the tumor, and if to remove it means destroying the innervation of the bladder and rectum, it is better for the patient, especially if it be a woman, to bear with the tumor. Doctor Stookey complimented Doctor Coley on his very skillful removal of the tumor and the excellent end-result, and, in conclusion, stated that Doctor Eckel of Buffalo had compiled a series of basosphenoidal as well as sacral chordomata, from the literature, which was most interesting.

TRAUMATIC ARTERIOVENOUS FISTULA OF THE PALM*

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NEW YORK

Case Report.—Mrs. B. LeD. (No. 112252), white, age 23, was admitted to the New York Hospital October 17, 1935, complaining of a painless swelling on the palmar aspect of the left hand. This swelling was noticed shortly after the emergency suture of a laceration produced by broken glass three and one-half years previously. The patient had been conscious throughout this period of a buzzing sensation in the region of the swelling. Aside from this peculiar sensation of vibration, the condition of the hand did not trouble her until about one year ago when she noted that the veins of her hand and lower left forearm were becoming swollen and more prominent. This was particularly marked after using the hands in daily household work. She had also noticed that the left hand was usually warmer and more moist than the right.

The patient presented herself for surgical treatment because of the noticeable enlargement, the subjective sensation of buzzing and vibration, and the fear that injury to the swelling might cause hemorrhage. Her past history was irrelevant.

Physical Examination was not remarkable other than for the findings relevant to the left upper extremity. Examination of the local lesion found a swelling in the region of the hypothenar eminence of the left hand, where a stellate scar was also visible. This swelling was easily compressible, and exhibited a thrill and bruit both synchronous with systole. The swelling covered an area approximating 5 x 3 cm. in size and was raised 1 cm. above the surface of the palm of the hand. About it there were numerous dilated veins, which extended halfway up the forearm. The ulnar artery could be compressed proximal to this swelling and its compression caused a diminution in the intensity of the bruit, but this was not entirely obliterated unless both the radial and the ulnar arteries were compressed simultaneously. Roentgenologic examination of the bones of the hand and forearm showed no appreciable variation from the normal, and

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those of the soft tissues showed the arteries and the veins of the left forearm to be unusually large.

The heart borders were within normal limits. A₂ was greater than P₂. A soft systolic murmur was heard over the apex. The systolic blood pressure in the left arm, on repeated observations, was ten to 20 points higher than that in the right arm, though there was no significant change in pulse pressure. Blood pressure before operation: 122/76 right arm; 132/80 left arm. Oscillometric readings on upper extremity were as follows: Right upper arm 10, right forearm 9; left upper arm 4, left forearm 3. Skin temperature over the left hand and the ulnar half of the left forearm was consistently four to five degrees higher than the same area on the right side. Special examinations with regard to the heart showed that the cardiac shadow on the roentgenogram was not

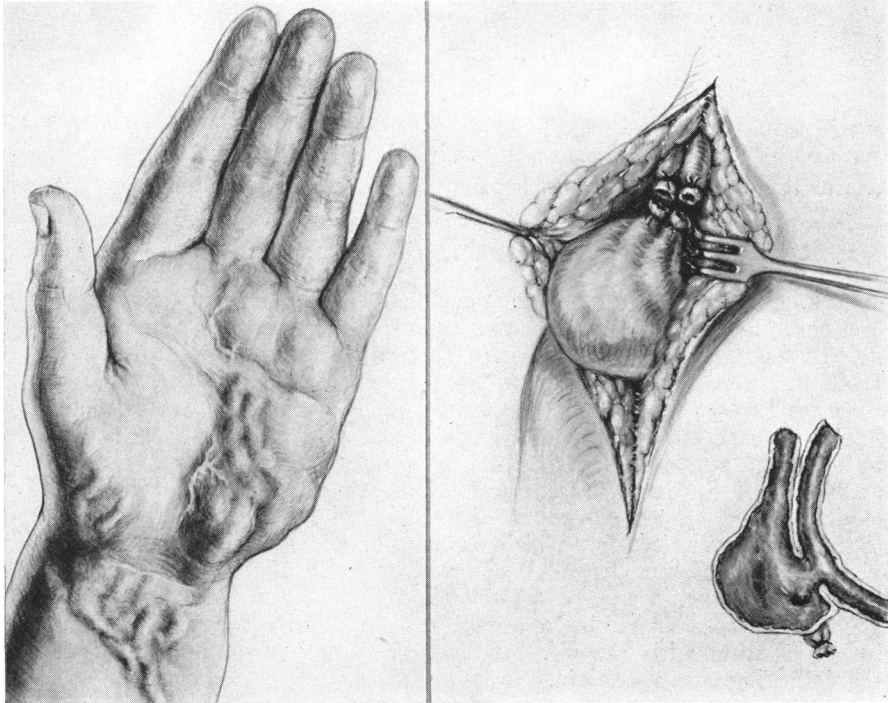


FIG. 1.—Drawing showing the dilated veins about the arteriovenous fistula.

FIG. 2.—Drawing showing the exposure of the arteriovenous fistula, and the appearance on cross-section of the specimen.

unusual, and was not an evidence of cardiac enlargement. The electrocardiographic readings were reported as essentially normal. Erythrocyte, leukocyte, and hemoglobin counts were within normal. Uranalysis was normal and the serologic tests for syphilis were negative.

Operation.—October 28, 1935. Under general anesthesia a tourniquet was applied to the left arm, and the palmar region explored through a curved linear incision 8 cm. long. Dissection revealed that the lesion was an arteriovenous fistula, between the superficial volar arch and the corresponding vein, with dilatation of the regional veins. Quadruple ligation of the involved vessels was performed with excision of the fistula bearing segments. A somewhat striking point in the examination of the fistula at operation was that the artery distal to the fistula did not vary appreciably in size from that proximal. It was the operator's impression that this was due to the large collateral circulation between the superficial and deep palmar arches. After the excision, the ligated stump

of the ulnar artery could be seen to pulsate visibly and pulsation could be obtained in the radial artery.

Immediately postoperative, the patient stated that she was no longer conscious of the buzzing and vibrating sensation in the left hand. A transient tourniquet palsy occurred which cleared up before discharge from the hospital 16 days postoperative. Electrocardiograms taken after operation showed no striking variation from those taken preoperatively.

Pathologic Examination.—The specimen consisted of a small, rather thick walled vessel, 3.5 cm. long and 0.5 cm. in external diameter, threaded on a probe. At one end was a dilated aneurysmal mass resembling a varicose vein, measuring 2.7 cm. in length and 1 cm. in external diameter. On opening the sac it was found to be lined with smooth endothelium and to be composed of a large, dilated cavity with a beaded, tortuous, sac like extension several millimeters in diameter. The sac was quite empty and the point of communication with the larger vessel was extremely difficult to locate. It was finally found in the smaller sac like projection and measured slightly over 1 Mm. in diameter.

This patient illustrated very well the tremendous enlargement of the veins which may take place after the development of an abnormal arteriovenous communication, and the ease with which the condition may be rectified after elimination of the fistula. Fortunately the abnormal communication occurred between vessels around which there is very ample collateral circulation so that their ligation was attended by no untoward sequelae.

DR. H. H. M. LYLE (New York) stressed the rarity of aneurysm of the hand in view of its rich circulation, the trauma to which it is frequently exposed, and the number of foreign bodies that have to be extracted from it. Since the presentation of a paper by him before the American Surgical Society, which was based on a study of 64 true aneurysms of the hand, the earliest of which dated back to 1837, two cases have been added by Doctor Matas, bringing the total to 66. In his search for cases with true aneurysm of the hand, he encountered a fair number of descriptions of a clinical variety of arteriovenous fistula that might be called a delayed type, that is, a congenital variety which seems to be activated by trauma, and which gives a very different prognosis and which is difficult to cure. Dr. J. Douglas presented such a case before the New York Surgical Society some years ago and the speaker had had one such case in addition to one he saw recently in consultation with Dr. W. MacFee. To emphasize the rôle of trauma, the following case was cited.

Case Report.—A boy, age 21, ran a fragment of glass into his hand, in 1920. In 1926 he broke his ring finger playing handball, and entered New York Hospital for treatment. The fracture was set and after three weeks the splint was removed, but the hand did not do well. The boy suffered a great deal of pain in his palm and there was considerable stiffness of all fingers. The condition was treated by heat and other usual measures, without improvement, until, 20 months later, he was admitted to St. Luke's Hospital, where a diagnosis of aneurysm of the palmar arch was made. He said that four weeks after the fracture he had consulted a dermatologist because the skin of the palm was becoming dark in color and the injured finger was turning blue. Six roentgen treatments had only aggravated the condition.

On admission, the skin of the palm and injured finger presented a typical picture of aneurysm. A very distinct bumblebee buzz was noticeable over the site of the old palmar scar. This sound was transmitted up the arm to the elbow and was accompanied by a typical thrill. The veins of the arm were dilated. On the assumption that the aneurysm was due to trauma, he explored the hand and found an arteriovenous aneurysm between the deep and superficial arches. This was dissected out and the surrounding vessels were

tied off. The patient remained well for six months and then began to complain of pain in the hand, so severe that he could neither work nor sleep. The congestion of the veins in the fingers had increased and the bumblebee buzz had returned with increased intensity. Roentgenograms showed that the bony openings of the nutrient arteries in the third and fourth fingers were much larger than normal, and that there were progressive atrophy and absorption in the phalanges. A second operation was undertaken, in which the radial and ulnar arteries were ligated and severed and the superficial palmar arch excised. Again, there was an apparent cure, followed within ten months by return of the symptoms. In a third operation, the ulnar and radial arteries, as well as the communicating vessels, were excised down to the pisiform bone, on one side, and into the snuff box on the other. In short, in these three operations the ulnar and radial arteries, and the superficial and deep arches, were excised. The interosseous artery was intact and some of the vessels had split the ulnar nerve in two. The patient remained well for one year and the bumblebee buzz did not recur, but he began to have pain and swelling in his fingers. They became extremely painful and deep ulceration appeared on the third and fourth fingers. First, the fourth finger was amputated; then, later, the third. After this he was able to return to work and has remained well during the three and one-half years that have since elapsed, so that there is reason to hope that the cure is permanent.

Summarizing the case, Doctor Lyle said that over a period of five years he succeeded in blocking off some of the congenital arteriovenous openings, with temporary improvement, only to find, after a lapse of time, that other congenital openings had expanded, bringing about recurrence of the symptoms, which ceased only with the final operation described.

DR. WM. F. MACFEE (New York) said that he had not had a case of traumatic aneurysm of the hand, but described a congenital arteriovenous aneurysm which he had treated, in which the communications were evidently multiple. The hand was operated upon a number of times. At each operation one or more definite aneurysmal dilatations were removed only to be succeeded by others developing at other sites. The index and middle fingers became spongy masses of dilated blood vessels and eventually had to be amputated. A considerable mass of palmar vessels near the bases of the fingers was excised at the time of the amputations. At present, the patient is free of symptoms and the circulation of the remaining portion of the hand appears to be relatively normal. There is no palpable or audible thrill and no pain. The sequence of events in this case followed the rule that amputations are necessary to effect relief.

PEDICLE BREAST FLAP FOR AMPUTATION STUMP

STRUCTURE SURGERY APPLIED TO AMPUTATION STUMP AT KNEE

JOHANNES F. S. ESSER, M.D.

MONACO

Case Report.—A. W., female, age 19, suffered an accidental amputation of her right leg, eight centimeters (three and one-half inches) below the knee joint. The wound would not heal, and no local skin or sliding flaps could be utilized, because of the probable formation of scar contractures. Furthermore, there was not enough of the proximal fragment of the tibia left to allow of a reamputation, without involving the knee joint itself.

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Doctor Oidtmann of Amsterdam, under whose care she had been previously and who referred her to me for further structive procedure, had already, ineffectually, attempted to graft skin from the adjacent leg by placing the stump under a raised flap. Having

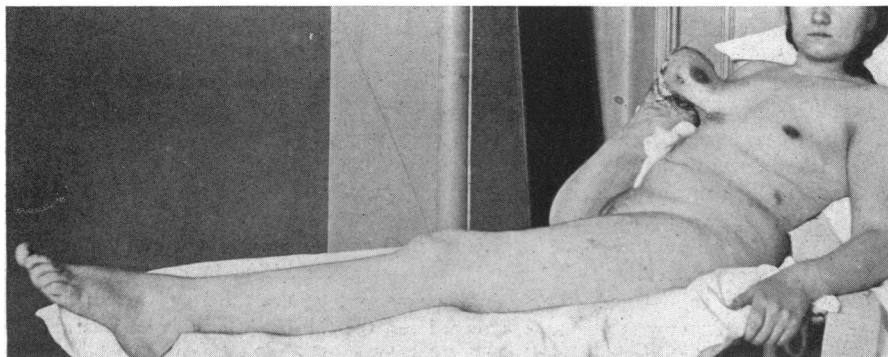


FIG. 1.—Showing posture necessitated in order to place the amputation stump of right knee in the incision in the right breast.

had considerable experience in the use of a pedicle breast flap in successful plastic reconstruction of deformities during the past 15 years, I determined to employ this procedure in the present instance.



FIG. 2.—Showing, more in detail, the manner of the approximation of the knee to the breast incision.

The skin covering the female breast is much more ample than on any other part of the body, in fact, the reduction of it is considered a cosmetic

advantage by many; and if one should wish the normal breast to be reduced in size, to conform to that of the partially amputated one, it can be readily accomplished. Indeed, it is seldom that, normally, both breasts are symmetri-

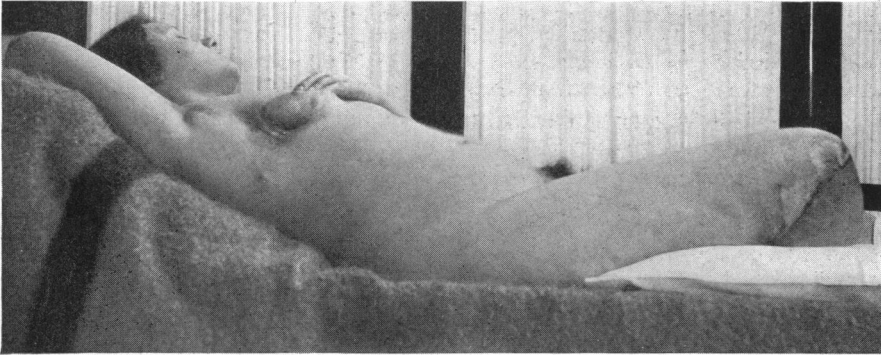


FIG. 3.—Showing the resultant scar in the breast and the well covered and healed amputation stump of the right knee.

cal. In the present instance, however, the patient did not object to the resultant postoperative deformity and refused to have it corrected and a plastic performed upon the normal one in order to make them equal in size.

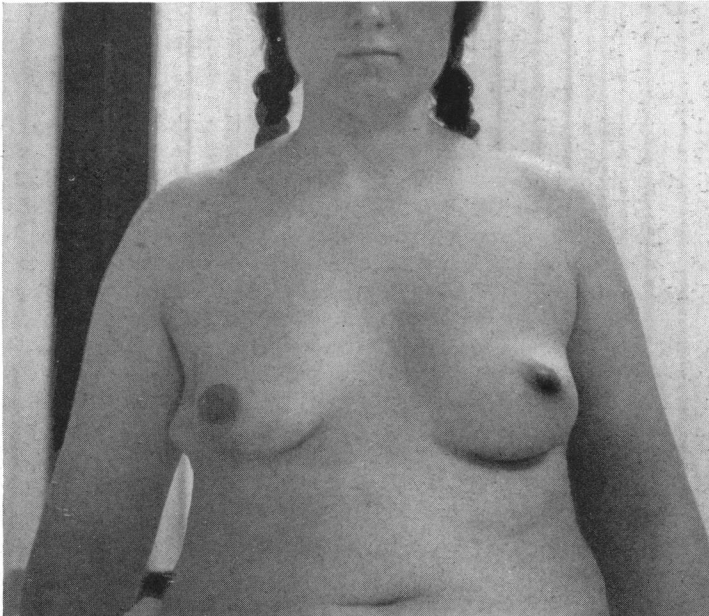


FIG. 4.—Photograph of the general appearance of the anterior view of the breasts.

In all cases where pedicled flaps have been utilized, after severance of the pedicle, some months must be allowed to elapse after the transplantation has been accomplished before the weight of the body should be allowed to press

upon it; and the first exercises with the use of a prosthesis must be undertaken very gradually.

The transplanted flap is at first quite insensitive and its circulation is definitely impaired; therefore, in the beginning, the limb may only be exercised for very short periods at a time, and then only under rigid supervision. The primary requisite is to have an accurately fitted prosthesis which may only be obtained from a plaster mold of the healed stump.

The patient in question had, in the beginning, small ulcerations on the stump, the result of local pressure necrosis, because she used her leg too much and too soon. This may have been predisposed to because of abnormal perspiration of the affected leg.

A structive operation, as indicated in the illustrations, was performed in August, 1925. Ten years have now elapsed and the end-result is quite evident. She is quite content with her infirmity and is otherwise well.

PEDICLE GRAFT OF SOLE OF FOOT*

WM. CRAWFORD WHITE, M.D.

NEW YORK

Case Report.—S. R., age 21, male, was injured 17 years ago in an automobile accident. He was admitted to the Lincoln Hospital suffering from multiple compound fractures of the toes with *Cl. welchii* infection. As a result, he lost his toes and considerable skin. The skin of the plantar surface posterior to the transverse arch became gangrenous and died. A skin graft operation was not permitted. It took six months for the raw areas to become covered over with thin epithelium on the plantar surface, with no soft tissue beneath. From then on, the patient had constant trouble with his foot. Ulcers formed and persisted for months, and infections were not infrequent.

Examination showed marked deformity of the right foot. The ankle joint was normal, as was the skin over the Achilles tendon. Hard skin was attached to the heel and sole of foot. He wore a shoe with a lining of rubber sponge and walked on the ball of his foot, with a slight limp. It was decided to apply a full thickness graft to the under surface of the foot, including the posterior surface of the *os calcis*. The delayed tubular graft was the method of choice.

At the Roosevelt Hospital, therefore, two parallel incisions eight inches long were made on the anterior surface of the left thigh. The subcutaneous tissue was freed from the underlying muscle sheath, after which the wounds were sutured. Fifteen days later, the oblong skin was folded under and the edges sutured to make a tube. This tubular graft was allowed to heal and nothing more was done for four months, because of a slight infection. At the end of that time, he had a tube about one inch in diameter and eight inches long. The skin was soft and pliable. At this operation, the distal end of the tube of skin was divided and the undersurface was split longitudinally and the edges everted. It measured two inches across. This was outlined against the sole of the foot. A corresponding area on the sole was then excised down to the plantar fascia. The right foot was now placed against the left thigh and the flap of skin sutured so as to cover over the raw area. The skin was covered with silver foil and rubber sponge pressure pads were applied over this. The limbs were held together by plaster bandage.

* Presented before the New York Surgical Society, March 25, 1936. Submitted for publication June 8, 1936.

Ten days later rubber covered stomach clamps were applied to the thigh end of the tubular graft to test the circulation. The clamp was left on for progressively longer periods. By the eighteenth day it was thought that the graft had taken and the skin was divided at its junction with the thigh. The tube was opened and the corresponding area over the heel was marked out and excised. The graft was then sutured over the raw area. There was some necrosis, but very little. A few days later the patient was allowed home on crutches.

It is now five months since the operation. Sensation has begun to return, although pain and temperature reactions have not yet reappeared. About two months ago I thoughtlessly gave the patient permission to walk, and due to lack of sensation he developed a pressure sore over the heel which took a long time to heal.

The condition is unusual, chiefly because of the trouble the patient had as there was no soft tissue under the skin, and illustrates the satisfactory results that may be obtained with the Gillies' delayed tubular, full thickness graft.

DISCUSSION.—DR. JEROME P. WEBSTER (New York) expressed the opinion that Doctor White had exercised very good judgment in not using free grafts, but a pedicle flap with a whole thickness of skin and fat, in order to give a pad to the bearing surface, particularly over the os calcis, and a delayed graft which increased the vascularization. A Gillies' tubular, pedicle flap is better in certain instances, even though it takes more time, because it avoids any possibility of infection. Frequently with a short tubed, pedicle flap, it is not possible to utilize as wide an area as when employing a simple, untubed flap. The difficulty with the latter is, of course, the added risk of infection. It is often possible to use a delayed, untubed pedicle flap which is retrograde, that is, the attachment is down toward the knee rather than up toward the hip. After delaying it in order to get a better vascular supply, it is brought further down so that the position is easier on the patient. As far back as 1497 Benedictus cautioned against the effect of the cold of winter on a new flap, and against pulling it off. The ulcer that occurred when Doctor White's patient put weight on the flap, before there was innervation to enable him to realize what pressure was doing to the flap, was a simple trophic ulcerative process.

DR. FENWICK BEEKMAN (New York) described a series of traumatic injuries, in Bellevue Hospital, in children whose feet had been crushed or the skin avulsed from the foot, and said that when, invariably, the loose phalanges had been removed and the foot left to granulate, the wounds would be pinch grafted after they had cleaned up, and would then heal. However, as the skin lay almost directly upon the bones, this procedure always proved to be unsatisfactory. Therefore, the method described by Doctor White has been used, that is, after the free grafts are put on, pedicle grafts are later applied to cover, more or less, the whole of the area, but especially those areas covering the bearing surfaces which are bound to break down. No attempt is ever made to place them on the granulation tissue for that would be too precarious. It is far preferable to wait until healing has taken place.

FRACTURE-DISLOCATION OF THE CLAVICLE*

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THE appended case report is presented to demonstrate the power of repair which occurs in children, following fractures, and also the ability to reproduce portions of bone which have been destroyed as the result of trauma.

Case Report.—W. E., age 11, a school boy, was injured October 9, 1935, by being crushed against a building by a truck, pinning his shoulder against the wall. He was admitted to Bellevue Hospital shortly after the accident, suffering from severe shock. On examination it was found that there was a lacerated wound over the left clavicle, which was actively bleeding. A clinical diagnosis was made of a compound comminuted fracture of the clavicle without protrusion of the bone through the wound. A large dressing was applied over the clavicle, which was bound tightly over the wound, and the boy was treated for shock.

Roentgenologic Examination demonstrated a fracture through the middle third of the left clavicle and a complete dislocation of the outer end of this bone. The distal fragment was composed of almost one-half of the clavicle and had been displaced so that it lay in a vertical position. There was also present a fracture of the glenoid fossa with the fracture lines running into the body of the scapula, with slight displacement of the fragments (Fig. 1).

A disagreement developed among the members of the staff as to what procedure would insure a satisfactory result. Forty-eight hours after the accident a tremendous hematoma had formed in the clavicular region and there was still some blood draining through the small wound over the clavicle. It was feared that the displaced fragment had lacerated the subclavian vein and, therefore, that a conservative course of treatment should be followed. Traction was applied to the left humerus by means of skin traction straps, to which a five pound weight was attached, and the arm abducted to 90°. It was felt by some of the staff that we should do something to correct the displacement of the fragment. Some wished to cut down upon it and excise it, others wanted to replace it and wire its distal end to the acromion process. We, however, continued to treat the condition conservatively.

On November 8, 1935, 30 days after the accident, the traction was removed and we were surprised to find that the boy could use his arm perfectly. A roentgenogram taken 30 days later showed a bridge of new bone forming between the distal end of the proximal fragment and the acromion process (Fig. 2). Measurements of the lengths of the clavicle on both sides showed a shortening of only one centimeter on the left side. The boy was discharged December 23, 1935, at which time the new bone forming the distal half of the clavicle had become dense and signs of erosion of the old fragment could be clearly seen in roentgenograms. Since then this erosion has continued and the size of the loose fragment is but one-third of what it was originally (Fig. 3). There seems no doubt that in a year's time this fragment will have entirely disappeared. Meanwhile the fracture of the glenoid fossa had completely healed without deformity, but in a recent roentgenogram an opening or hiatus is seen in the body of the scapula.

The boy now has normal function, and measurements show no shortening of the bone. Palpation of the clavicle reveals a mass extending into the supraclavicular fossa which is caused by the formation of new bone beneath the periosteum, which was raised up in a ridge by the displacement of the fragment.

* Presented before the New York Surgical Society, May 13, 1936. Received for publication June 17, 1936.

FIG. 1.—Roentgenogram showing a fracture-dislocation of the outer third of the clavicle and a fracture of the neck of the scapula.

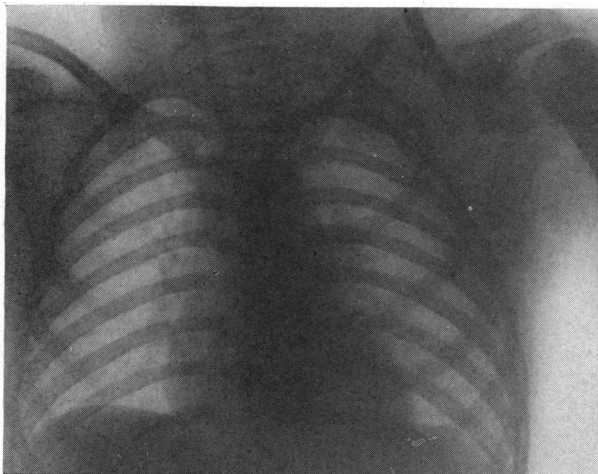


FIG. 2.—Roentgenogram showing the condition eight weeks after the accident. Note the formation of new bone between the inner fragment and the acromion process.

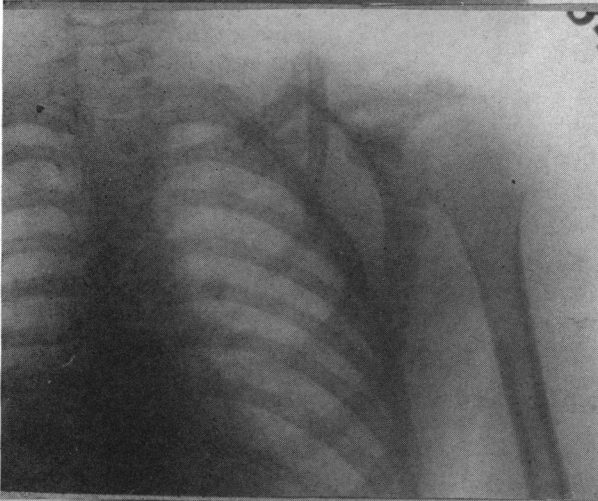
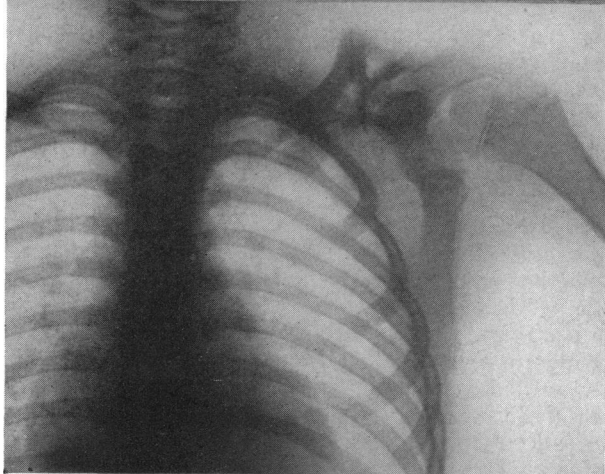


FIG. 3.—Roentgenogram showing the condition 28 weeks after the accident. A new clavicle has been formed. The displaced fragment is undergoing absorption.



Inquiry may be made as to what effect this accident may have had upon the growth of this bone. This to me was at first a question of some importance until it was recalled that the clavicle has but one epiphyseal cartilage which is situated at its sternal end.

I think this case demonstrates the power of a growing bone to replace loss in its continuity, and that in many cases a conservative course of treatment is wiser than the undertaking of a radical procedure, before it is known what nature may accomplish.

DISCUSSION.—DR. CARL G. BURDICK (New York) congratulated Doctor Beekman on his conservatism, adding that he and Doctor Beekman had had the opportunity of seeing a good many fractures in children and that while, every now and then, they were quite surprised at the final results in cases of marked displacement, he doubted if they had ever been more pleased than by the results obtained in this particular case. If one looks at the roentgenogram carefully, it is possible to see a bridge of periosteum along which the new bone is being laid down. He believed that eventually the displaced fragment would be absorbed. One sees quite often in supracondylar fractures of the elbow with a considerable posterior displacement, the bridge of periosteum between the displaced fragment and the shaft with new bone being laid down along it, followed by absorption of the displaced proximal fragment, generally with hardly any evidence of fracture at the end of two or three years. When one has observed many of these cases there is a tendency to become a little too conservative. It is important to appreciate the difference between fractures with considerable displacement of the shaft of the bone and fractures involving the joints. Comparing greenstick fractures, where there is a considerable amount of bowing, with fractures of both bones of the forearm with marked displacement and considerable overriding, one finds that cases of marked bowing take very much longer to correct themselves than do those where there is a complete fracture with considerable displacement and overriding.

DR. JOHN J. MOORHEAD (New York) referred to the possibility of there being shortening on account of involvement of the epiphysis. Contrary to the general belief, he said that it is very difficult to recall a case of long bone fracture in a child in which, even with considerable involvement of the epiphysis, there had been lasting changes. In trying to review these, as Doctor Beekman presented his case, Doctor Moorhead said the only cases he could think of in which ultimate function is lacking is in fracture of the lower end of the femur, in which one is much more likely to have epiphyseal changes than in any of the other bones.

DR. CLAY RAY MURRAY (New York) emphasized the benefits of conservative treatment in fractures in children. Regarding the question of whether permanent damage is or is not rare in epiphyseal injuries, he said that he had had occasion to see epiphyseal separation result in permanent damage. In a recent careful follow up at Presbyterian Hospital, it was found that between 4 per cent and 5 per cent of cases with an epiphyseal separation showed damage with deformity, and that while approximately 75 per cent of these, after a period of years, were normal, 25 per cent—or 1 per cent of all epiphyseal separations—showed permanent deformity requiring operative intervention.

DR. FENWICK BEEKMAN (New York) in closing said that the healing of fractures in children is quite different from that of fractures in the adult. The periosteal tube is a very important factor in the production of a new shaft. Some years ago he presented before the New York Surgical Society a supracondylar fracture with a great amount of displacement of the lower fragment in which a new shaft was being formed to connect up with the displaced epiphysis of the humerus, while the old shaft was being absorbed. That child did not have full function until two years after the injury because of the presence of the old shaft. Of course, the epiphyseal side is the site where, in all probability, the proliferation of cartilage cells occurs. Therefore fractures that cut across epiphyseal cartilage are those in which we most often find interference with growth, and where a fracture does involve the epiphyseal cartilage one should always give a poor prognosis. In those which do not involve it there is no danger whatever of interference with growth. Regarding epiphyseal injuries, Doctor Beekman said that he has had the opportunity to see a large number of fractures, in which the fracture line was not shown in the film, but where the cartilage of the epiphysis has been injured together with injury of the capitulum or the trochlear, and the proliferating cells were involved, yet when these children were discharged from the hospital there was no deformity. However, many returned after four or five years with marked valgus or varus deformities, due to damage of the trochlear or capitulum growth centers; this is also true of certain cases of separation of the lower epiphysis of the radius, but in these cases one can see the fracture line running across the epiphyseal cartilage. Doctor Beekman said he was very much opposed to operation upon dislocations of the epiphysis of the lower end of the radius, for the simple reason that they all straighten out if one gives them time. On the other hand, if one goes in with his chisel he may injure the proliferating cells of that plate. Regarding the possibility of shortening in the case presented, when the boy left the hospital he had less than 1 cm. shortening. When examined one week ago, this had been diminished to less than .5 cm. and this will probably not increase. In fact, the epiphyseal cartilage plate at the sternal end may be stimulated so that eventually this injured side may actually be longer than the other.

HIGH INTESTINAL FISTULA

A METHOD OF TREATMENT

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THE management of a duodenocutaneous fistula or any other type of high intestinal fistula requires the surgeon's best effort. There are two serious complications that must be guarded against. One is the resultant alkalosis or acidosis depending upon the location of the fistula and associated with the loss of salts in body fluids. Such loss unless replaced continuously by physiologic solutions leads to death. The second complication is a severe excoriation of the skin and deeper structures of the anterior abdominal wall by the intestinal juices.

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This skin reaction is of a chemico-inflammatory type characterized by erosions terminating in slough. The phenomenon is due to enzymic digestion and may or may not be accompanied by bacterial contamination. Co-Tui¹ has demonstrated on a qualitative and quantitative basis that all skin excoriations of surgically produced intestinal fistulae are due to tryptic digestion varying in concentration in the fistular discharge from 200 trypsin units (sigmoidostomy) to 2,000 trypsin units (cecostomy). The higher the location of the fistula the greater the loss of intestinal enzymes, and the more marked the effect on the skin surface.

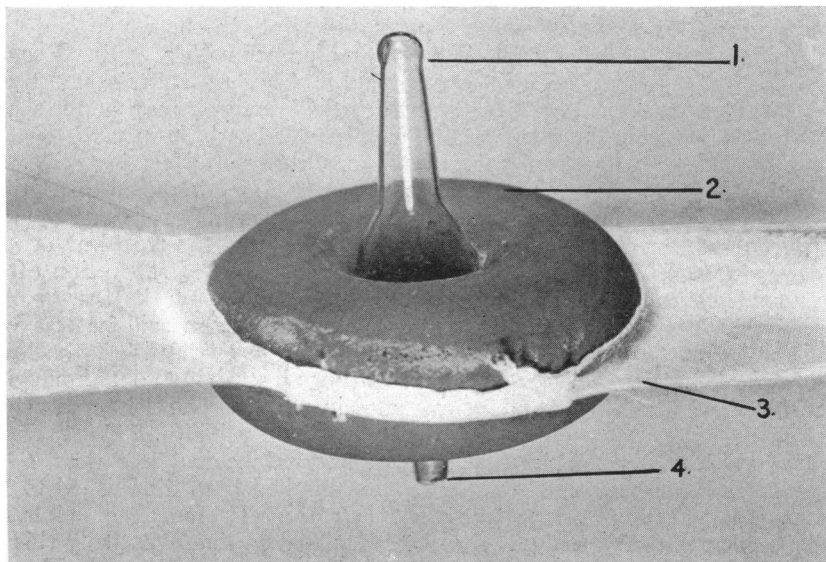


FIG. 1.—Close-range view of fistula belt. (1) End of Murphy drip tube for attachment to suction. (2) Rubber pessary ring. (3) Moleskin bandage sewed around rubber ring. (4) End of Murphy tube which fits into fistulous stoma.

A high cutaneous fistula occurs usually after surgery upon the stomach, duodenum, or jejunum. With the increase of plastic surgical procedures on the gastro-intestinal tract, the incidence of fistula has increased. The latter complication becomes apparent usually after the fourth postoperative day, and is due to leakage from the intestinal suture line, unnoticed trauma to intestinal tissue from pressure clamp or fistulization from improperly located drain. Immediate surgical repair by direct suture or sidetracking anastomosis is never indicated because of the high mortality (50 per cent) directly related to the patient's poor general condition.

Conservative therapy offers the best prognosis. Appended is a brief review of the various efforts directed to prevent the skin excoriations, which, if not controlled, assume vast proportions and may quickly involve the entire abdominal wall. The type of treatment of a fistula may be either mechanical or chemical. The chemical methods are usually of three types. Potter² recommends a beef preparation which is placed about the stoma of the fistula

and encloses decinormal hydrochloric acid introduced directly into the opening of the sinus. Co-Tui³ popularized the use of kaolin, which is a colloidal absorbent, for the electronegative trypsin. Various methods for the irrigation of the area about the cutaneous fistula with antacids or antalkalis, to inactivate the ectopic enzyme, are also recommended. The mechanical methods consist principally of the removal of the fistular contents by means of suction (Cameron,⁴ Lahey⁵). Einhorn recommends the passage of a duodenal tube beyond the opening of the fistula with feeding by this method. Others have tried to plug the external opening of the sinus and have met with varying degrees of success.

We report a method of treating high intestinal fistulae which embraces both mechanical and chemical means. We find that chemical methods alone without suction are inadequate. The device described has been used successfully on four cases.

ILLUSTRATIVE CASE REPORT

Patient J. H.—On the fifth day following a plastic gastro-intestinal repair for duodenal ulcer, a discharge was noted on the dressing. This was at first believed to be a simple wound exudate but proved to be intestinal juice, and the existence of a fistula was appreciated. Direct plugging of the fistula failed. Potter's beef preparation did not seem to restrict the excoriation which was rapidly spreading. The patient's condition was precarious. It was estimated that he lost from one to three liters daily of intestinal juices through the fistula. Continuous intravenous infusion barely replaced the fluid loss. Though an intern was detailed solely for the management of this case, the excoriations progressed, involving the entire surface of the abdomen and were extending up onto the chest wall. Five pounds of kaolin were used daily for dressings which were changed hourly but which proved quite inefficacious. Suction as obtained from the usual operating room electric apparatus was not feasible because of the pain evidently caused by excessive suction pulling on the intestine.

The following apparatus was finally elaborated. It consisted of a Wangenstein suction which seemed to give "physiological" suction and at no time caused pain. A soft

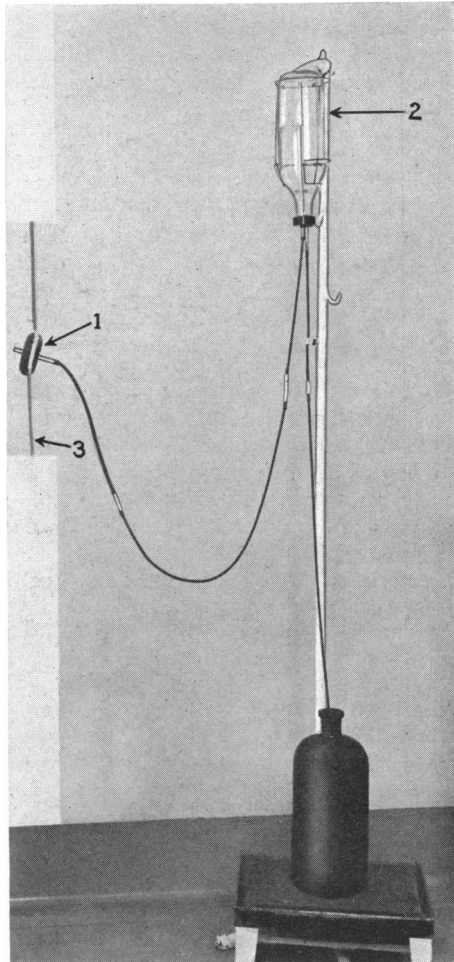


FIG. 2.—Showing fistula belt attached to suction ready to be applied. (1) Rubber pessary ring containing Murphy drip tube. (2) Wangenstein suction. (3) Moleskin belt sewed onto rubber ring.

rubber pessary, which resembles a doughnut in appearance (Fig. 1.) was placed about the fistular opening. To its side was sewn muslin bandage, or adhesive was attached. The belt was fixed by tying it around the patient's back. The hole of the pessary lay directly above and coincided with the stoma of the fistula. Tightly fitted into the pessary was a Murphy drip glass cannula, the tip of which just dipped into the fistula about a centimeter below the skin surface. The outer end of the cannula was connected to the Wangensteen suction (Fig. 2). About the large circumference of the pessary a small amount of koalin was heaped. This method worked satisfactorily. It was in continuous use for three weeks. The progressive erosion of the skin ceased and spontaneous healing ensued. After a week, the patient was allowed food by mouth. It was interesting to see him start the action of the suction by opening the valve of the Wangensteen tube whenever he felt the escape of juices onto the skin; or stop the suction when he felt dry. The sinus closed spontaneously.

SUMMARY

- (1) A simple method, combining the advantages of mechanical and chemical means, for the prevention of skin excoriation, and the closure treatment of high intestinal fistulae, is reported.
- (2) It has been satisfactorily employed in four cases.

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