training, no cardiac abnormality had been noted. The patient walked into the hospital, apparently in normal health and without any complaint.

Physical Examination.—The patient was a well developed and well nourished man of 26, walking and exercising without fatigue or dyspnea. His pulse rate was 80 in the dorsal position—regular, rhythmic and equal. The left chest was somewhat less full, and the left costal border lagged. Three scars were visible—the first just below the angle of the left

Fig. 2.—Lateral view of the chest: The fragment can be seen at the level of the fifth thoracic vertebra, just to the left of the body, near the pedicle.

scapula, 2 cm. long; the second just above the outer third of the left clavicle, 1 cm. long, barely visible; the third, an operative scar, followed the left fifth rib from the midaxillary to the mammillary line. The fremitus over the left chest laterally and posteriorly was less than on the right side; the percussion note over the left chest in the axilla and below the scapula was impaired. The breath sounds were somewhat distant over the left back, but no evidences of moisture were found. The physical signs were believed to be those of a moderately thickened pleura.

Heart: The point of maximum impulse was in the fifth interspace, 8.5 cm. to the left of the midsternal line. The cardiac borders were as follows: The right cardiac border was 2.5 cm. from the midsternal line at the second, third, fourth and fifth costal interspaces; the left cardiac border was 2 cm. from the midsternal line at the second costal interspace, 6 cm. at the third, 8.5 cm. at the fourth and 8.5 cm. at the fifth interspace. The heart sounds were normal; a loud murmur, metallic in quality, was heard best over the third rib 6 cm. to the left of the midsternal line. This murmur, like the sound produced by the striking of cymbals, began in systole and faded away in diastole. It had one point of maximum intensity, although it could be heard over the entire left chest anteriorly and laterally. The murmur was heard faintly in the back, but was not transmitted to the vessels of the neck. It was equally intense in the various bodily positions, but when the arms were elevated vertically it faded out, and as gradually reappeared when the arms were lowered. This disappearance and the recurrence were noted on several examinations. Respiration did not change its character, but exercise intensified it. The reaction to exercise was within normal limits; the pulse rate dorsal was 80; standing, 80; after 100 hops, 100; two minutes later, 72.

Roentgenographic Report: "Metallic body about 2.5 cm. long and 0.5 cm. wide, apparently a shrapnel fragment, lodged in the chest at the level of the fifth thoracic vertebra, just to the left of the body near the origin of the pedicle." (R. Shoemaker 3d, First Lieut., M. C.)

COMMENT

An extracardiac murmur was evident in this case of chest injury caused by shrapnel. The murmur was dependent on cardiac systole and independent of respiration. It was distinctly separate from the cardiac

sounds. It was not affected by change of bodily position except on elevating the arms, when the murmur faded out, to reappear on lowering them. The aorta rises to the level of the fourth thoracic vertebra, curving to the left of the fifth thoracic, so that the murmur may have been caused by the vibration of the scar tissue adjacent to the piece of shrapnel. Whether or not the murmur was due to the vibration of connective tissue with the foreign body acting as a sounding board could not be determined, but it may be definitely concluded that the murmur was a direct consequence of the chest injury, and that connective tissue played a distinct rôle in its causation. The act of raising the arms probably served to relax the strand of tissue, which was taut in other positions. Except for the unusual physical sign, the condition of Private A. F. was normal on discharge, and he has returned to civil life able to assume his prewar occupation.

THE ADVANTAGES OF THE VAGINAL ROUTE IN RESECTION OF THE RECTUM FOR CANCER

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No attempt will be made here to enter into a full discussion of cancer of the rectum. That subject is too large for the scope of this paper. It is a well known fact that sufferers from cancer of the rectum may live a long time, much longer than those who suffer from cancer in almost any other part of the body. Cancer of the rectum offers more prognostic hope than does cancer in other locations. This is largely due to two factors: The type of cancer is usually adenocarcinoma, which is slow growing; and the region about the rectum is very scant in lymphatic supply, and therefore metastasis is slow and does not occur until the growth has encroached on other surrounding structures.

It is remarkable that cancer of the rectum may exist for so long a time without being discovered, and when

Fig. 1.—Rectum completely blocked by tumor.

discovered is found not to have involved surrounding tissues. Indeed many cases go on to a condition in which the rectum is completely blocked, and obstruction of the bowel takes place, before they are found, the symptoms being attributed to hemorrhoids or some other condition largely because no careful examination has been undertaken by the attendant.

Much has been written lately concerning the abdominal route, the sacral route and the combined abdom-

inal and perineal routes. The old Kraske operation and others have been relegated to the junk heap, while the merits of the others and the question of a primary colostomy have been discussed at length; but I cannot find that much

hemorrhage and consequently less shock, which is an important factor in these weakened and toxic patients. There is no bone resection as in most perineal and sacral operations. I have always thought that the chiseling and sawing of bone in any operation must add materially to the shock of the operation. The dissection by the vaginal route is easy, the exposure is more perfect and one works in

Fig. 2.—Long median incision from cervix to anus.

Fig. 3.—Vaginal flaps laid back exposing rectum (courtesy of Lea & Febiger).

Fig. 4.—Rectum and growth lifted from its bed.

is said about the vaginal route in women, the simplest and easiest method of all.

It is undoubtedly true that in the greater number of operations on the rectum for cancer the condition of the patient is much improved by a preliminary colostomy, just as happens in draining a bladder before doing a radical prostatectomy. Toxins are eliminated thereby, and opportunity is given for ulceration to be overcome. Inflammation is reduced, and an inoperable is often converted into an operable case. Intestinal obstruction is obviated if impending. The accompanying symptoms of pain, constant secretion and defecation are relieved, so that the patient may sleep and rest. Recuperation is thus insured, and the patient resumes her usual routine of life and is soon put into such a condition that she may successfully withstand the more radical major operation.

The technical advantages of the vaginal over the sacral route should be apparent to him who understands the anatomy of the pelvis. There are no important structures to be taken into account below the peritoneal fold except the two tubes which pass out through the levator ani muscle, namely, the vagina and the rectum. The operation consumes less time, there is less traumatism to the tissues, there is less

an open field rather than in the dark, thus being able completely to control hemorrhage.

Fig. 5.—Resection of rectum (upper section should show clamp applied) (courtesy of W. B. Saunders Company).

Fig. 6.—Tube sewed into upper segment emerging from anus.

Instead of being a *bête noire* of surgery, this operation for resection of the rectum for cancer resolves itself into little more than a complete dissection of the

perineal structures for extensive vaginal repairs. The late John B. Murphy was an ardent advocate of this method of approach and did much to develop its technique. The operation is practicable only when the tumor is movable and is situated in the lower half of the rectum. If it is as high as the rectosigmoidal junction, then the combined abdominal and vaginal operation should be employed.

In beginning the operation, the sphincters should be thoroughly divulsed and the secretions of the rectum well washed away. A transverse incision is then made across the vagina at the junction of the mucous membrane of the posterior vaginal wall and the cervix. Perpendicular to this a median incision is carried down the whole length of the posterior vaginal wall over the perineum down to the anus. If the sphincters are to be retained, this incision should be deflected to each side at the anus. If not, it should continue completely around the margin of the anus. As the long median

similarly clamped and divided below the tumor. A 1 inch rubber tube is sewed into the upper end of the bowel and brought down and out through the anus, over which the anastomosis of the bowel is completed. After making the anastomosis it is well to draw the tubing down, slightly invaginating the upper into the lower bowel, and making a double row of sutures so as to assure perfect union and prevent leaks.

In case the sphincters are removed with the rectum, the upper end of the bowel is brought out a full half inch or more beyond the anal skin and sewed fast to it. There is apt to be less stricture, perhaps, when the sphincters are removed than when they are not, but of course at the expense of fecal control. It is necessary to follow up the patient in these cases and keep the anus and bowel well dilated with rectal bougies as an after-treatment to prevent the formation of strictures.

After the rectal work has been completed, the

Fig. 7.—Anastomosis over tube completed.

Fig. 8.—Sutures placed for vaginal and perineal repair (courtesy of W. B. Saunders Company).

Fig. 9.—Vaginal excision of the rectum—the rectum sutured. A tube is tied into the divided end of the bowel.

incision is deepened through the vagina and perineum down to the rectum, a large, thick flap of tissue is laid back on either side. This is made up of the muscular and ligamentous attachments of the vagina and rectum. When the rectum is reached, the fingers may be passed down along side of it and by blunt dissection the hand is passed, finally, completely behind it, lifting it out from its bed. It may then be easily pulled forward and it is remarkable how much of a loop of bowel may thus be pulled down. If it is rigid and there is difficulty in bringing it down, the simple expedient of nicking the posterior layer of the mesentery of the sigmoid at its lowest point just at the peritoneal fold will overcome the difficulty and allow it to come down freely.

The rectum is then clamped with a right angled, rubber tipped clamp about two inches above the margin of the growth and the rectum divided. If the sphincters are to be retained, the distal end of the rectum is

muscles of the perineum are built up layer by layer, just as they would be in an extensive repair of the perineum, the lower lip of the cervix being sewed down to the transverse upper incision in the vagina.

Abdominal Symptoms Following Typhoid Inoculation.—

Such symptoms were observed at Camp Custer in twenty-seven out of sixty-five admissions for typhoid reaction, and usually were not a cause of confusion in differential diagnosis from appendicitis. Typhoid inoculation did not appear to have played any demonstrable rôle as a cause of appendicitis or its recurrence. Typhoid inoculations have apparently resulted in recrudescence of old gallbladder disease; in a number of these there was a previous history of typhoid. In every case of abdominal pain, appendicitis should be considered, but attention to history and other symptoms and signs should usually result in avoidance of mistakes. A helpful thought in medicine is that reliance on any supposed pathognomonic sign, unsupported by other evidence, is dangerous.—*Review of War Surgery and Medicine* 2:28, 1919.