GASTROCOLOPTOSIS

ITS PATHOLOGIC SIGNIFICANCE AND ITS SURGICAL TREATMENT*

THORKILD ROVSING, M.D.

Professor of Clinical Surgery at the University of Copenhagen
COPENHAGEN, DENMARK

Essentially there are two theories which have governed medical men's conception of ptosis as a secondary, rather insignificant phenomenon: the one, Glénard's theory, tends to show that enteroptosis is the result of an enigmatic nutritive disease, a *dialthèse hépatique*, which involves atrophy and subsidence of the small intestines, whereby the organs lying above lose their support, which secondarily leads to gastropptosis, hepatoptosis, etc. This theory has now been abandoned by most in favor of Stiller's hypothesis which, in place of Glénard's mysterious liver-disease, sets up a so-called congenital, universal asthenia, a congenital weakness, laxity and gracility of the entire structure of the body, as of the individual tissues. The ptosis and the constipation are due to laxity and atony of the tissues, the pains and the nervous symptoms to neurasthenia, the whole simply being a manifestation of degeneration, and, as degeneration cannot be cured, it is natural that all votaries of this doctrine must regard a surgical therapy for enteroptosis as senseless. Simple logic tells us, therefore, that Stiller's theory is in the main at fault, and tells us to look around for another explanation of the overwhelming frequency of ptosis with women. In my opinion a very simple explanation is found in two circumstances peculiar to women, 1, their misuse of corsets and laces, and 2, the changes which pregnancy and childbirth involve in the intra-abdominal pressure.

Of Stiller's theory, then, there remains only this: that the corset and lace pressure when brought to bear on quite young, half-grown girls with soft, relaxable ribs naturally has especially easy play with those of the degenerative type, among whom the bones and tissues are particularly relaxable and flaccid.

Even in my article in *Hospitalstidende*, in which in 1898 I reported my first case of gastropexy, which led to a permanent cure of the considerable sufferings of this ptosis-patient, I set forth in its main features the conception that all the morbid symptoms and conditions which we find typical in patients with enteroptosis allow themselves naturally and spontaneously to be explained as a result of the ptosis. The correctness of this conception has been confirmed by the observation and study of the 400 cases which I have personally treated, the statistics of which I shall submit to you to-day.

I. VIRGINAL GASTROCOLOPTOSIS

Symptomatology.—In the course of the first or second year after the commencement of puberty, and when the wearing of corsets commences, the previously healthy individual begins to suffer from persistent constipation, to which is quickly added weariness, headache, loathing of food. In addition to these symptoms there occurs after some time cardialgia in the form of severe pains, which are always situated to the left of the median line and occur as soon as the patient partakes of food. The quality of the food has no significance so far as the

rise of these pains is concerned, whereas the quantity—the mass and weight of the food—is of great importance, for which reason these patients can get along only by taking many, quite small meals during the twenty-four hours. In many instances, the commencement of the pains is accompanied by vomiting, and with a small group of these patients each meal is invariably and immediately succeeded by the discharge of a part or the whole of the food partaken of. In the first instance, the patients may maintain an astonishingly healthy appearance for many years; but if they disgorge everything, and are furthermore frightened by fear of the pains from attempting to eat, emaciation sets in, which may often reach an extreme degree, and present that aspect which I have called gastropptosis-cachexia, and which may result in the death of the patient as a consequence of inanition.

By examining the chemical function of the stomach one generally finds that the measure of acidity is normal, but in a certain number of cases one finds achylia, and in others, conversely, hyperacidity and even gastrosuccorhea. In more than half of the cases, the motor function is completely normal, inasmuch as the stomach empties itself entirely in the course of four or five hours. In from 30 to 40 per cent. of the cases there is a slight delay (five to seven hours), while food-remains are rarely found eight hours after one of Bourget's experimental meals.

With many of these patients a whole series of nervous symptoms develop gradually as a result of this state of auto-intoxication and inanition, such as oppression across the loins, in the pelvis and the abdomen, clammy hands and feet, palpitation of the heart, physical depression; with some a mental relaxation and with others a sensation of dread. Finally disturbances in the function of the genital organs develop very rapidly, because the menstruation becomes irregular and is accompanied by diffuse pains in the abdomen and a deterioration of the regular symptoms. The menstruation is frequently very deficient and for years may entirely fail to appear.

I look for the cause of the virginal ptosis patients suffering so much more than the maternal ptosis patients do from pains and vomitings after meals in the circumstance that the tight abdominal wall and the narrow abdominal cavity do not permit of the free subsidence of the loosened organs. The result is that the stomach and also the colon fold themselves transversely with the longitudinal axis, and angles and bends occur which hinder the natural passage of the food and produce stasis and pains. The fact of the matter is, that all the vessels and nerves to the stomach from the large vessels and nerve-roots have their course just between the peritoneal layers, which either form the suspensory ligaments or cover these. They form, so to say, an integral part of the suspensory ligaments and, when these are folded, are also subject to bends and folds. and when the ligaments are stretched and lengthened by the subsidence of the stomach, a considerable drag is also exercised on the vessels and nerves. That such a distention of the sympathetic threads and thereby of the semilunar ganglion and of the vagus nerves, which, with the esophagus, extend into the thorax cavity, cannot fail to affect the activity of these nerves seems evident, and here, surely, is to be found the explanation of many of the nervous symptoms of these patients. As regards the invariable pains in the left side of the epigastrium, it seems to me that these are explained naturally as having their origin in the drag on the sensitive nerves which have their course in the subperitoneal tissues.

* Read in the Section on Surgery of the American Medical Association, at the Sixty-Third Annual Session, held at Atlantic City, June, 1912.

* Because of lack of space this article is abbreviated in THE JOURNAL. It appears in full in the Transactions of the Section.

Diagnosis.—The three wrong diagnoses under the flag of which virginal ptosis most frequently sails are (1) *ulcus ventriculi*, (2) *colitis* and (3) nervous diseases of the stomach or hysteria.

Those cases in which violent cardialgia and vomitings occur as an immediate result of meals and dominate the aspect are naturally confounded with *ulcus ventriculi*. This confusion happens all the more easily because the violent and frequent vomitings by no means rarely show streaks of blood, or even such a strong admixture of blood that they assume the character of *hematemesis*. The presence of constipation, indeed, only strengthens the diagnosis, because it is so often a symptom with *ulcus*.

In addition to this the examination of the position of the stomach by scraping auscultation, or by roentgenoscopy after a bismuth meal often reveals a subsidence which is disproportionate to the acute symptoms.

The differential diagnosis from *ulcer* is, as a rule, easily determined from the following facts: (1) the seat of the cardialgia being to the left of the center line; (2) the independence of the cardialgia of the quality of the food, but its dependence on the quantity of this (an *ulcer* patient suffers pain from eating rich, sour, spiced food, no matter how small the quantity, but stands milk; while a *ptosis* patient stands all such food equally well so long as the quantities are quite small, but suffers severe pain from milk and other neutral food when the quantity is too large); (3) the influence which the position of the body has on the symptoms. These are always worse in an upright position, and always improve and often disappear entirely with confinement to bed.

The cases in which constipation dominates the aspect of the disease, while the stomacheic symptoms are comparatively minor, are often confounded with *colitis*. In many cases the confusion is promoted by this, that the constipation involves in reality a *colitis* with periodically occurring diarrhea. Here, also, is a differential diagnostic symptom of great value: that with *ptosis*, confinement to bed has a highly favorable effect on the constipation; while constipation arising from other causes generally gets worse with confinement to bed.

The diagnosis of hysteria and nervous disease of the stomach is generally given with such patients as have for a long time been vainly treated with *ulcer*-therapy or anticonstipation treatment, partly because their having been vainly treated for a supposed organic disease leads to the diagnosis of functional neurosis, and partly because these patients, little by little, on account of their protracted sufferings and the fruitless treatment, become in a great degree psychically exhausted and nervous individuals. The differential diagnosis from hysteria is, however, by no means difficult, when one analyzes the history and the aspect of the disease; because, it then always appears that constipation and dyspepsia have been the first symptoms of the disease, and still constitute the central feature in the aspect of the disease. Scraping auscultation and roentgenoscopy show us the presence of the *ptosis*, and, finally, an exact examination shows that the really hysterical stigmata are practically always wanting.

More rarely, the pure *ptosis* is confused with cancer. This happens with those patients who have become completely emaciated by vomitings and abhorrence of food lasting over many years, and who have acquired a cachectic complexion from the auto-intoxication arising from the stagnating contents of the large intestine.

I have already mentioned that, even where no trace of *ulcus* can be proved at the operation, *hematemeses* are

not infrequent with *gastroptosis*. Such *hematemeses* are probably due to stasis in, and swelling of, the mucous membrane at the places where the wall of the stomach is creased.

Finally, in a certain number of cases, the virginal *ptosis* leads to the development of an hour-glass stomach. I think, indeed, that I dare assert that the solution of the long disputed question of the pathogenesis of the hour-glass stomach is to be sought for in the fixation of the creases of the subsided stomach caused by corsets and laces. The two theories which have hitherto stood in opposition to each other are, as is known, first, that the hour-glass stomach is a congenital deformity, and second, that it is due to *ulcer*, according to which the hour-glass form is due to cicatricial shrinkage.

An investigation of the history of the disease as regards the twenty-six cases of hour-glass stomach which I have personally observed shows that the first symptoms of the disease have always occurred during the years of puberty, when the misuse of the corset and the tight lacing commence; in their main features these symptoms entirely resemble those of virginal *ptosis*. Little by little the increasing hindrance of the passage, the retention and the dilatation in the proximal part of the stomach are maintained as an aspect of the disease, and, if *hematemesis* and *melenas* occur in consequence of developing ulcerations, the aspect becomes more and more that of *ulcus stenosis*.

By my numerous operations for *gastroptosis* I have been able to observe all the stages of the development of the hour-glass stomach, in consequence of which I have formed in my own mind a consecutive view of this.

With virginal *gastroptosis* the bends of the creases occur essentially and naturally in two places: (1) on the lesser curvature at the transition between the *pars cardiaca* and *corpus ventriculi*, in the very place where the triangular solid gastrophrenic ligament (called by some *pars condensata omenti minoris*) ceases and is relieved by the more elastic portion of *omentum minus*; (2) on the medial edge of the hepatoduodenal ligament where the free portion of the duodenum (with the pylorus) bends toward the fixed part.

The hour-glass formation is generally due simply to the fine adhesions which form themselves in the folds of the serosa surfaces which rest one on the other.

The development is sometimes greatly favored by the fact that the *omentum minus* by coalescing with the *omentum majus* assumes a lace-formation. With *gastroptosis* we very frequently find a complete loosening of the *omentum minus*, the central part of which subsides and hangs over the anterior side of the stomach like a tongue-shaped clump of the omentum. It may then come in contact with the tip of the *omentum majus* and coalesce with this in a ribbon which draws a deep furrow in the stomach. The adhesions mentioned as occurring between the peritoneal surfaces, which I have seen in all stages, from the thin, veil-like adhesions, which are easily loosened, to the quite solid ones which are hermetically soldered, fix the *ptosis* creases, and these, like partition walls, protrude into the lumen of the stomach.

II. THE MATERNAL GASTROCOLOPTOSIS

It is this form we find in women whose abdominal wall consequent to past pregnancies and confinements has become distended and relaxed. Hereby the intra-abdominal pressure is altered, and the support, which the air-filled intestines offered to the subdiaphragmatic organs while the vigorous elastic abdominal wall acted, fails.

With women whose stomachs lie in a normal and secure position at the moment when the relaxation of the abdominal wall commences, it depends entirely on the strength of the ligaments whether a gastroptosis ensues at all. With strong women this does not occur; but with others, whose abdominal wall is less capable of resistance, a ptosis develops little by little; the development differing from the virginal ptosis in this, that the coloptosis is generally primary. Colon transversum, which is no longer borne up by the small intestine pelotte, is weighted down by the heavy feces so that it hangs like a downward convex festoon suspended by the two flexures. The pull first affects ligamentum gastrocolicum and mesocolon, which are elongated and dragged downward. It is quite common to find the gastrocolic ligament elongated to three or four times its normal length, when it is quite thin and perforated in many places. Second, it affects the stomach, the suspensory arrangement of which is also, little by little, stretched and elongated. The constipation and accumulation of fecal matter in the colon resulting from coloptosis affects with steadily increasing strength the downward drag on the colon and the stomach. It frequently happens that the heavy, feces-filled colon lies right at the bottom of the pelvis and, like an anchor, holds the stomach fixed

the unpleasant, depressing feeling that something is subsiding in the abdomen and from an oppressive feeling of fatigue across the loins. The drag of the subsided stomach on the cardia and the esophagus causes constant pain in the left side of the epigastrium and, not infrequently, difficulty in the passing of the food through the esophagus, so that a spasm of the cardia may arise; similar conditions sometimes occur with secondary dilatation of the esophagus.

It is characteristic of the disease that all these symptoms improve or vanish entirely with confinement to bed, while they at once recur or become worse with an upright position.

The coprostasis may attain such stages that attacks resembling ileus may occur, and, in extreme cases, the stomach may also become so loose that volvulus ventriculi may occur.

There ought not to be any rivalry between the medical treatment and the surgical treatment—if only for the reason that these patients always seek the medical man first, and it is only when all medical treatment has proved vain that they seek the surgeon, and then very frequently with one of the above mentioned erroneous diagnoses.

When the surgeon has comprehended the correct nature of the disease, the question is whether the case lends itself to bandage-treatment or whether it demands an operative treatment.

As regards the indication for the employment of a bandage, this varies greatly with the two forms of ptosis which I have described. While the majority of the maternal ptosis patients may be helped sufficiently with a good and rational bandage, with virginal ptosis patients one only quite exceptionally obtains an effect worth mentioning. This simply lies in the fact that the virginal abdominal wall is so muscular, vigorous and elastic that, to overcome its resistance, such a strong pressure would be necessary as would be unendurable to the patient. With maternal ptosis, on the other hand, we are able to obtain good results through the relaxed thin abdominal wall with a good bandage.

Numerous bandages for ptosis patients have been described, but only a few of these are of real value. An effective and good belt must comply with three requirements:

1. The pressure must act widely over the hypogastrium by aid of a large and rather firm pad.
2. The pressure must be powerful and invariable.
3. One must be able to adjust the belt in a recumbent position in the morning, before the patient rises, and while the organs still lie in their right position. For this reason all bandages which fasten at the back with laces are banned. I have returned to a copious, firmly stuffed pelotte, on a steel-spring belt. Here, as with the English double hernial truss, the pressure is exercised by two spiral springs which are movably connected with the large abdominal pelotte in front, and at the back are supported against os sacrum or against symphysis sacroiliacae by one or two small pelottes. These springs can be made as powerful as one wishes, and relax but slowly and slightly, when they are easily tightened again. But even this powerful belt, which I recommend as the best, is impotent with most virginal ptoses as also with those particularly severe cases of maternal ptosis in which the colon transversum has subsided into the small pelvis, and is on that account beyond the range of the belt, being squeezed rather than raised by this.

✓ In all these cases, then, the only help for the patient is an operative procedure which will raise the stomach and

The truss as worn (see description in text).

in its subsided position. Furthermore, the stomach can drag down with it the lower part of the esophagus, and then we encounter gastroptosis in its extreme form.

With maternal ptosis the aspect of the symptoms differs from that of virginal ptosis in this, that the stomachic attacks—cardialgia and vomiting—are far weaker—are often, indeed, absent. It is due to the far more favorable conditions of space, as the stomach is not jammed or liable to be folded and bent as is the case with the virginal abdomen. For the same reason these patients do not generally suffer the innumerable pains and nervous sensations which characterize the others. That it is the distinction as regards space which causes the difference in the aspect of the disease is quite clearly perceived in the transition of a virginal ptosis to a maternal ptosis. So soon as the first confinement is accomplished, a great improvement occurs in the condition of the patient so far as these symptoms are concerned.

With maternal ptosis, the constipation with all its consequences is the dominant feature in the aspect. In course of time the effect of the auto-intoxication from the intestine reveals itself. The patient grows emaciated and sallow, suffers from headache and, in addition, from an ever-increasing sensation of subsidence, and from

colon into their normal position. For the achievement of this object we are in the possession of various methods: (1) direct gastropexy as it has been for the first time performed, independently of each other and after different methods, by Duret and Rovsing, and (2) the indirect operations which endeavor to raise the stomach, either by basting together and shortening the omentum minus as proposed by Stengel, Bier and Beyea, or from below as with Coffey's operation which, by stitching the omentum majus firmly to the anterior abdominal wall, raises the stomach and colon.

Notwithstanding the theoretic attraction of the indirect operations I must in accordance with my experience advise direct gastropexy as the safest and best method.

When in 1897, I thought for the first time of performing gastropexy on a patient who was admitted with the diagnosis of cancer ventriculi, but who only showed gastropptosis pure and simple, I at once employed the method which I firmly recommend as the best. Parallel with the lesser curvature I lead three strong silk threads in and out through the serous coating of the anterior surface of the stomach, leaving the pars pylorica free. The upper thread is placed close under the lesser curvature, and the two others, with an interval of about 2 cm., are placed in such a way that the greater curvature and a rather large piece of the wall above this are left free. With a fine needle the serosa coating between the threads is now scarified in all directions, also the surface of the parietal peritoneum, and eventually that part of the under side of the liver to which one wishes the stomach to adhere. The ends of the silk threads are led out through the entire thickness of the abdominal wall, that on the left as far from the center line as the rib-curvature permits, and that on the right at about 3 cm. to the right of the center line. The peritoneum is now joined with catgut, and the fascia and skin with aluminum bronze, and, after the line of wound has been covered with collodion and cotton wool, the silk sutures are tied over a glass plate covered with sterile gauze, the dimensions of which are a little larger than the stomach-surface which has to be fixed. In this way it follows that the anterior surface of the stomach lies flat, and close to the abdominal wall, without shrinkage and folding. These threads are left for four weeks and are then easily removed. A perfectly secure and solid adhesion is then obtained without leaving any foreign body in the abdomen.

Since 1897, when I performed my first gastropexy, till Jan. 1, 1911, I have myself performed the operation 163 times, and have received information from other Scandinavian surgeons of ninety-three operations performed in accordance with my method. All these 256 patients have been traced and their condition since the operation carefully examined, with the following results:

RESULTS WITH AUTHOR'S METHOD OF GASTROPEXY		
Result	No. of Cases	Per Cent.
Complete cure	162	63.2
Great improvement	33	12.8
Improvement	18	7.0
Slight improvement or no change...	32	12.8
Deaths	11	4.6

AUTHOR'S RESULTS COMPARED WITH THOSE OF OTHER SURGEONS

Results	My Statistics		Statistics of Scandinavian Surgeons	
	No.	Per Cent.	No.	Per Cent.
Cure	92	50.6	70	75.2
Great improvement	24	11.0	9	9.6
Improvement	18	11.0	11	11.8
Slight improvement or none	21	12.8	3	3.2
Deaths	8	4.9		
	163		93	

First, as regards the mortality, it may well be said that a mortality of 4.6 per cent. is *per se* small. But on analyzing the cause of death in the individual cases the real mortality from gastropexy proves to be far smaller. As concerns my own patients, two died a fairly long time after the operation from tuberculosis of the lungs, while four extremely exhausted patients died from bronchopneumonia during the week following the operation, but without any morbidity at all in the peritoneum. On the other hand, two died from ileus; the one from a duodenoventricular ileus due to the strangulation of the duodenum over an old adherence, the other from ileus of the small intestine due to an accidental strangulation of a coil of the bowels over an old adherence due to an old hysteroplexy.

As regards the three deaths mentioned in the statistics of the other Scandinavian surgeons, two of them had absolutely nothing to do with the gastropexy as such: the one was due to a casual perforative appendicitis, the other to bleeding from a gastro-enterostomy performed simultaneously with gastropexy. In the third case, however, death must be ascribed to gastropexy, inasmuch as it was due to ileus of the stomach, the necessity of hepato-pexy having been neglected; the sunken liver then rode over the pyloric part of the fixed stomach.

The mortality with gastropexy proper is then three in 256, or 1.17 per cent. As regards the recoveries, seventy-one, or 75 per cent., of the patients were cured to the extent of being relieved of their pains, of regaining a healthy appearance and their strength, and, from being incapable, depressed, miserable wrecks, of becoming able-bodied, healthy and happy people.

There then remain about 25 per cent. of the cases in which the effect of the operation has not been satisfactory: in 11 per cent. the condition was improved considerably, but in 12.8 per cent. the improvement was quite insignificant or *nil*. As regards the cause of the bad results an analysis of these cases warrants the hope that still better results may be attained in the future.

In some cases an imperfect diagnosis has been the cause of the bad result, as for instance the overlooking of an ulcer in the stomach or in the duodenum, or of cancer in another organ.

Finally there is a very important point which explains the difficulty of obtaining in many cases a complete cure for these patients, that is, the many consequences of enteroptosis and lacing which are coordinate with gastropptosis and coloptosis. First, the straightening of the lowest aperture of the thorax may be so considerable that there is no longer any room at all for the liver and the stomach, and therefore it is impossible to fix the stomach in a satisfactory manner without jamming it, just as it is impossible to get the colon sufficiently raised and to straighten out its folds and bends.

Even if the condition of the patient improves somewhat, the pains and the constipation in particular will nevertheless continue after the gastropexy.

Where the stomach is concerned I think that one may obtain better conditions: partly by giving up any idea of its reposition, inasmuch as one fixes it lower down where there is room for it, and partly by making the abdominal cavity more capacious with a plastic enlargement of the abdominal wall. In such cases I have attained an excellent result by doubling the width of the musculi recti.

Here, in this fortunately small group of cases, is, according to my experience, the real indication for Arbuthnot Lane's "shortening" by ileosigmoidostomy,

which I have employed with excellent results in two otherwise desperate cases.

What still has great influence on the results of gastropexy is the ptosis of other abdominal organs, above all, of the liver and the kidneys, which is so frequently present.

Therefore, with attendant hepatoptosis, hepatopexy should always be performed simultaneously with gastropexy. How frequently this is indicated is seen by my having had to perform hepatopexy in no less than sixty-eight of my cases. I perform this in part directly with silk sutures which fasten the serosa covering on the convexity of the liver to the diaphragm, and in part indirectly with the aid of the ligamentum teres. This is severed after a double ligature, and the topmost end sewed to the diaphragm with strong silk thread, whereby the liver is raised up. It is of great importance that hepatopexy shall be performed very substantially with wide scarifications, in order that the heavy organ shall not tear itself loose again and sink down on the stomach. Sometimes the lacing involves the development of a large hypertrophied left lobe of the liver, which pushes against the lesser curvature, and thus makes impossible the replacement of the stomach in its normal position. In four cases I have been obliged to remove such a lobe of the liver by resection, in order to be able to perform gastropexy.

In some few cases in which pains and constipation remain after gastropexy this is due to the subsidence of one or both kidneys, and the patients do not then recover entirely until after a nephropexy. With ten of my cases it was not until after a unilateral or a bilateral nephropexy that I succeeded in attaining an absolute result. A right-sided nephroptosis, especially, often involves a subsidence of colon ascendens and a pressure on the cecum, thereby keeping up the constipation and pains.

Gastro-enterostomy is never indicated with a simple gastropexy, experience even showing indeed that it is a highly injurious operation, inasmuch as not only do the existing symptoms deteriorate greatly, but an entirely new complex of symptoms also supervenes: nausea and gall-vomitings. This is simply due to the fact that gastro-enterostomy does not at all strike at the cause of the stasis which lies in the large intestine and far down in the small intestine at the opening into the cecum, but, on the contrary, instead of removing the drag and the weight which the subsided stomach exercises only increases this further, and a bend will very easily arise on the subsided folded coil of the anastomosis, which leads to a more or less pronounced *circulus vitiosus*.

Gastro-enterostomy, then, only increases greatly the sufferings of the ptosis patients, and even reduces them to a condition of extreme emaciation and misery. At one time or another I have had eight such patients under treatment. With four of these I have obtained a complete cure and with the other four a very great improvement by separating the intestine and the stomach at the point of the anastomosis, and, after having individually closed these, by performing gastropexy.

If physicians, the world over, could have their eyes opened to the right diagnosis and treatment of these symptoms, an extraordinarily large number of suffering, disabled persons might regain health and strength by a bandage-treatment or by gastropexy, and the physicians would be relieved of the most ungrateful and wearisome patients.

THE ROLE OF THE MOVABLE KIDNEY IN INTESTINAL AND VASCULAR STASIS*

KENNETH A. J. MACKENZIE, M.D.

Professor of Operative Surgery, Medical Department, University of Oregon

PORTLAND, ORE.

Speculation is still rife as to the causes of the falling of the viscera from their respective positions in the abdominal space. It is generally admitted that there is a constitutional type in which there is a symmetrical descent of all the organs, and many observers are agreed that many of the extreme types encountered are due to congenital anomalies or defects. According to Rosen-gart's theory, congenital splanchnoptosis implies the persistence of the embryonic positions of all or part of the abdominal viscera, while the acquired forms imply the gradual reversion from normal to fetal positions. Arrest of any abdominal organ at certain stages of fetal development establishes the conditions that determine ptosis, and in order that the right kidney and the ascending colon shall attain their normal positions it is necessary for the colon to pass in front of and across the right kidney, and if this rotatory movement fail and the colon remain in its fetal position, both organs remain displaced, occupying positions characteristic of splanchnoptosis. In like manner, the loose attachment of the peritoneum covering the right kidney and its imperfect extension over the colon without proper grasp of the latter offer the conditions necessary for abnormal mobility of the right kidney.

In one or other of the groups referred to one would include many of the cases classified as Glenard's disease, many of which doubtless are acquired according to the rules laid down by Glenard, who taught that the organs made their descent in orderly sequence, beginning with the fall of the transverse colon. Later observations have established variable and varying sequences of descent. Attention is called to the frequency with which ptosis of the right kidney takes place as a result of trauma, and also ptosis of the colon as the result of loading of the bowel in habitual constipation. Ptosis of individual organs is far from being uncommon, the solid viscera, because of their relative weight, furnishing the most frequent examples.

The uterus is a most striking example of a solid organ subject to ptosis because of intrinsic conditions which effect alterations in its dimensions, positions and weight. The hollow viscera, because of their light weight and air contents, naturally float high in the abdomen, subject always to variations because of the unnatural burdens they are often forced to carry. To what extent the abdominal organs are maintained in their respective places by the force of abdominal pressure is uncertain. According to the views of Weisker, the only demonstrable force exerted when the abdominal muscles are quiescent is the hydrostatic pressure of one organ on the other in mutual contact, faceted and held together in the same space. It is difficult to believe that this force can do much toward giving them poise and fixity in their respective positions.

Of paramount importance in the study of acquired forms of splanchnoptosis is the determination of the organ of primary displacement. That there are several

* Read in the Section on Surgery of the American Medical Association, at the Sixty-Third Annual Session, held at Atlantic City, June, 1912.

* Because of lack of space this article is slightly abbreviated in THE JOURNAL. It appears in full in the Transactions of the Section and in the author's reprints.