

elimination, despite the diuresis which they incite. This is well shown in the following table from Beebe:<sup>43</sup>

The postprandial rise in uric acid elimination is, however, greatly exaggerated by ingestion of alcohol, especially when a meal rich in purin constituents is taken. The contrast is seen in the following averages compiled from many comparable results by Beebe:<sup>44</sup>

Control Day.		Alcohol Day.
Hour.	Uric Acid. mgm.	Uric Acid. mgm.
9 . . . . .	18.9	19.0
10 . . . . .	15.7	16.3
11 . . . . .	17.1	16.4
12* . . . . .	16.1	14.4
1 . . . . .	12.8	16.2
2 . . . . .	15.6	19.5
3 . . . . .	19.3	25.7
4 . . . . .	23.6	28.3
5 . . . . .	24.8	34.2
6 . . . . .	25.5	28.8

Residue of Twenty-four Hours.	
Control Day.	Alcohol Day.
Uric acid . . . . . 338 mgm.	Uric acid . . . . . 442 mgm.

\* Meal hour.

Evidently the purin metabolism is noticeably modified by the alcohol absorbed. Bearing in mind the two-fold action—uric acid formation and destruction—which the tissues are capable of, Beebe has interpreted his results to indicate an inhibition of the destructive (uricolytic) phase. The fragmentary data regarding the rate of uric acid elimination have been briefly referred to in this place in order to indicate some of the newer procedures which are being brought to bear on the production of uric acid in health and disease. They contribute little new to the problems with which we have been more directly concerned.

#### FUTURE PROBLEMS.

Thus I have attempted to subject to a somewhat critical review the more recent experimental observations which should contribute to a better understanding of the formation of uric acid in the body. Its probable endogenous and exogenous antecedents have been considered and the probable chemical reactions involved in the genesis of uric acid from other purin compounds have been detailed. Attention has also been directed to the peculiar rôle of enzymes in both the formation and destruction of uric acid; the organs and tissues concerned, as well as the factors modifying these metabolic changes, have been considered. After all, a résumé serves its best purpose in enabling the scientist to appreciate the limitations of his methods and to learn the true worth of his data, so that from time to time he may formulate his problems more precisely. He thus starts anew in his quest of the truth with better defined aims and a consequent renewal of enthusiasm.

Research brings forth questions as well as answers. The patient reader will have discovered many gaps in the chain of uric acid metabolism, where the missing links remain to be discovered. We assuredly need to know more about the origin and significance of endogenous uric acid. How and why is it modified in such physiologic states as starvation, in growth and in disease—in conditions where “the metabolic processes that determine the uric acid excretion may be said to be in a relatively unstable equilibrium?” What interpretation

shall be given to variations in the endogenous output; and what is the tolerance of the body for purins in diverse conditions? What determines the balance between formation and destruction of uric acid and how do the different tissues participate in its chemical regulation? Are the differences in the purin metabolism of unlike species explicable by qualitative or quantitative considerations? These and many other inquiries at once present themselves; and the patent limitations of our knowledge stimulate the investigator to renewed efforts and awaken his interest.

### TREATMENT OF APPENDICITIS IN ITS VARIOUS STAGES AS IT COMES TO THE SURGEON.\*

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So much has been written and spoken on this subject in the last decade that one might suppose that all had been learned as to its management, but the wide divergence of opinion between the surgeon and internist as to its treatment in general, and the different views maintained by surgeons themselves as to the management of the different stages when encountered, would indicate that many questions are as yet to be settled before the happy mean is reached.

#### STAGES OF THE DISEASE.

For the convenience of discussion I have divided appendicitis into six arbitrary stages, with very liberal lines of demarcation, as follows: First, inceptive stage, first forty-eight hours; second, rapidly progressing stage, third, fourth and fifth days; third, non-progressing or stationary stage; fourth, interval or chronic stage; fifth, the abscess stage; sixth, the diffuse peritonitis stage.

Before taking up the various stages of appendicitis which I have outlined for my own convenience in dealing with the subject, I believe I am warranted in stating that there exists general satisfaction on the part of surgeons in the gradual and growing realization, both on the part of the general practitioner and of the laity, that appendicitis is strictly a surgical disease and demands surgical treatment at all times at properly selected periods of that time.

This surgical dictum, when first enunciated by surgeons some years ago, met with rather positive resistance on the part of the internist, but with the turning on of the light by operative measures and the exemplification of the true pathology of this affection, error, as it always must, has yielded to the truth, until to-day every educated and up-to-date practitioner admits that therapeutics has no place in the cure of this disease.

*First: The Inceptive Stage* (first forty-eight hours).—All surgeons are convinced and many internists admit that every patient with appendicitis that comes to a capable physician with proper environment within the first forty-eight hours of the disease should have and is entitled to a curative procedure which will secure for him restoration to health with the least risk of life. The not infrequent experience of every surgeon in encountering the most advanced pathology, a perforated and gangrenous appendix, even in the first or second day, argues the danger of throwing away the opportunity of certainty for one of uncertainty and great hazard to life.

43. Beebe: *Loc. cit.*, p. 20.

44. Beebe: *Loc. cit.*, p. 30.

\* Read before the Western Surgical and Gynecological Association at Kansas City.

If clinicians could more often observe the pathology at the operating table, in all its intensity, in some of the mild cases, and in other cases of pronounced symptoms see a pathology limited to the appendix alone and with almost a doubt as to its departure from normal, they would grow more tolerant to operative measures and less wedded to therapeutics in the inceptive stage.

The physician or the surgeon who persuades a patient in the inceptive stage to wait for the interval assumes a responsibility wholly unwarranted, for the interval stage by no means comes to all; in some, opportunity has knocked and, unadmitted, has gone never to return.

Certainly the physician and surgeon have a common interest in saving the life of the patient, and the study by each of the pathology at the operating table must tend to a mutual conclusion as to the proper management of this disease in its various pathologic stages. This common study, we believe, is gradually growing toward, and will eventuate in, a universal professional belief that all patients with appendicitis if possible should be operated on, if seen by the surgeon, during the first thirty-six or forty-eight hours. The failure to make a diagnosis on the part of the practitioner and the refusal of the family and patient to listen to a reasonable demand for operative measures in the inceptive stage are responsible for almost all the factors entering into the mortality of appendicitis.

*Second: The Rapidly Progressing Stage* (third, fourth or fifth day).—The stand taken by a few surgeons that the appendix should be removed regardless of the stage of involvement is not in harmony with pathologic process known to be present at certain times of the disease. This is the stage in which experience and experiment have demonstrated that operative measures increase rather than lessen the mortality. It is in this stage that Ochsner enunciated a sound surgical principle: lavage and peristaltic rest by rectal feeding. The facts of its misconception and of its misapplication on the part of the medical profession in general by no means disproves the correctness of his theory. The probably enforced admission that this procedure has resulted in greater harm than good, probably increased the mortality of appendicitis in general in its first years of promulgation, by no means argues its nullification in eventually proving a life-saving procedure. The seizure of this treatment by the opponents to the surgical treatment of appendicitis in general in its application to all cases has proved a curse to humanity and a set-back to the advancement of proper surgical treatment of the disease.

That a better understanding and better education will confine its application to the class of cases intended by the author we believe to be a certainty. That the rapid attacks on Ochsner by some surgeons have been actuated by the commercial sting in the misapplication of his theory by the general practitioner and an apparent lessened number of patients for surgical aid rather than the real scientific difference with him is plausible to a competent and unbiased observer. The admitted honesty of Ochsner, the extensiveness of his clinic for a number of years and the verification of his experience by a large number of other surgeons should be convincing evidence of the correctness of his theory, even if the critic has not the fairness to admit or the clinical material necessary to prove it in his own work.

Operation in this stage usually means rapid extension of the sepsis and death; peristaltic rest means a limitation of the lesion and a day most favorable for surgical intervention. That the duration of this rest period may and is often extended too long is the belief of many surgeons.

Not infrequently cases come to us from the general practitioner with the remark, "I put this patient on the Ochsner treatment; he improved for a time and then had a relapse."

There is a time when Nature totters under her burden and a leak takes place in her fortification, and the case extends into the general peritonitis stage unless the surgeon comes to her rescue at the proper time. Experience and good judgment must decide the time limit in these cases. The extreme position taken by Ochsner in the early promulgation of his treatment by waiting two, three or four weeks I believe to be unnecessary, as Nature will have done all the good in her power in from ten to twenty days.

*Third: The Non-Progressive or Subsiding Stage.*—Not infrequently an appendicular disease comes to the surgeon with all the symptoms and physical evidence of a subsidence. Reason would indicate that Nature in this case had mastered the situation for the time and would lead to a period of safety if judiciously assisted by rest and a guarded diet. Experience has fully convinced the conservative surgeon to keep hands off and to let these cases drift into the interval period. In these cases the disease seldom shows a tendency to relight into active progress unless the quietude is disturbed by injudicious dietetic measures or ignorant therapeutic applications.

*Fourth: The Interval Stage.*—This is the stage for self-congratulation for the one who reaches it—an unpromised but fortunate entrance on *terra firma* in the march of appendicular inflammation. This is the stage of sanguine hopes, splendid promises, ideal surgery and happy culmination by surgical operation. If the ideal management of appendicitis were possible, this stage would never be reached. If the surgeon could see all the cases in the inceptive stage there would be no interval stage, there would be no abscess stage, there would be no peritonitis stage and comparatively few fatal stages, but until the family physician the world over follows the lead of such men and internists as Billings, Fitz and Biggs, who favor and teach early operations, surgeons will have to continue to battle against the desperate stages with their uncertain termination.

*Fifth: The Abscess Stage.*—The patency of an abscess in the right side of the abdomen is convincing evidence to patient, friends and family physician that surgical interference is indicative and imperative. It has been proved within the last two years that the only way of elimination of the appendix from the abdomen is by excision, hence the explosion of the old theory that the appendix sloughed and came away with the pus and *débris* from an incised and drained appendicular abscess. Recurrence after simple incision, necessitating reoperation and the invariable presence of the original offending organ, has convinced surgeons that to cure appendicitis the appendix must be removed. Another observation worthy of note is the attachment of the appendix in all cases at the line of original incision.

Radical operators like Deaver and his followers, acting on the established fact that cure means removal, advocated and claimed to practice separation of the adhesions and removal of the offending organ in all cases with a low-rate mortality; this procedure, however, has been received with considerable doubt. Many surgeons following the teachings of Deaver, by reason of a large mortality, have been compelled to abandon this radical procedure and many others have never seen their way clear to follow it, but have been content with the simple drainage. Those more conservative and possibly more conscientious practitioners believe in two safe rather

than one dangerous operation in abscess cases. I believe that in all cases of appendicular abscess patients should be told that the first operation is only a preparatory measure for the removal of the appendix at a period not further distant than from five to eight weeks.

*Sixth: Stage of Diffuse Peritonitis.*—In the past two years greater advancement has been made in the treatment of patients in this than in any other stage. Prior to this time surgeons in general took a pessimistic view of the possible benefits of operative measures, regarding these cases as beyond hope, no matter what the treatment. We now call these cases diffuse or general peritonitis in contradistinction to those in which the patients are moribund. Operation here is left to the fee-grabber or to ignorant men whose work is a discredit to surgery. The simple application of the natural laws of drainage as advocated by Fowler—that is, keeping the patient in the sitting posture—gave surgeons the cue as to the rational efficacy of operative measures in this particular stage of appendicular disease. Trustworthy reported results of a few surgeons invited trial by surgeons in general, and this gave convincing evidence of the better results that may be attained by more perfected technic in this desperate class of cases. The debatable question here is not operation or non-operation, but the rudeness or tenderness of the aid offered. Shall we simply incise and effectively drain the dependent cavities, or shall we go further and attempt to flush out the offending debris? An investigation of the advocated method shows about an equal division on the part of operators for flushing and non-flushing. In the absence of reliable statistics and confirmation of the greater merits of either method, the individual judgment and experience of each operator must decide whether it is best to foster, to protect and to assist Nature, or by rough fingers to tear away the fibrous exudate and to wash septic material over an unsoiled territory. A limited experience and the careful consideration of the pathologic condition found in this stage leads me to believe that the least manipulation possible means the least mortality.

Medical men, as a rule, believe in the diluting and neutralizing effect of a serous exudate on the toxins of infection and admit that further dilution by salt water may prove beneficial; but why inflict greater trauma to an already wounded peritoneum by flushing when there is an innocent and equally beneficial route of dilution by the application through healthy avenues of absorption? We all realize the circumscribing fraction of a fibrous exudate; why tear down the protecting wall to toxin invasion?

#### SUMMARY.

I believe, with the mind open for conviction and liable to complete reversal by future advancement, that:

First.—Appendicitis is always a surgical disease.

Second.—Every patient should have and is entitled to operative measures within the first forty-eight hours.

Third.—The rapidly progressing stage is the stage of applicability of the Ochsner treatment, and this offers the lowest mortality.

Fourth.—Cases coming to the surgeon with evidence of gradually subsiding symptoms, should be deferred to a more favorable operative period.

Fifth.—Operation should be urged in every interval or chronic case.

Sixth.—In abscess cases two safe rather than one hazardous operation should be done.

Seventh.—In diffuse peritonitis all dependent cavities should be carefully incised and drained and not flushed, and, secondarily, the offending organ should be removed.

## A METHOD FOR THE CORRECTION OF CICATRICAL TALIPES CALCANEUS.\*

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OMAHA.

The method for the correction of some forms of old talipes calcaneus is illustrated by the two following cases:

*CASE 1.—History.*—A. B., aged 20, when 4 years of age had the dorsum of the right foot and the lower third of the anterior aspect of the leg severely scalded, producing a sloughing of the skin from the entire burned area. The resulting wound was a long time in healing, which was accomplished by granulation, ending in a dense mass of cicatricial tissues, which in contracting produced an extreme dorsal flexion. After the lapse of several years two different attempts were made to correct the deformity by making a transverse incision, dividing all the soft structures down to the tibio-tarsal joint. The foot was brought down to its normal position. The separation of the wound margins was so great as to produce a large, gaping defect over the dorsum of the foot. In spite of the attempt made to maintain a corrected position of the foot by means of variously constructed devices, the deformity recurred as soon as the operative defect closed over, which it only could do by a process of granulation and cicatricial contraction.

*Examination.*—At the time of his admission to the hospital the following condition was noted: The right foot was in extreme dorsal flexion and very moderate varus position. The dorsum pedis was nearly in contact with the anterior aspect of

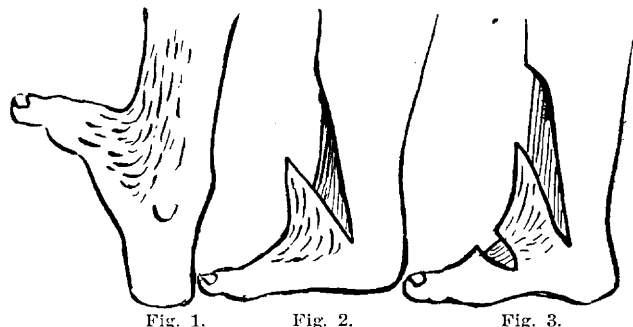


Fig. 1.

Fig. 2.

Fig. 3.

the leg and was held in this position by a thick, dense mass of scar tissue, which seemed intimately adherent to the tibia and the tarsus and metatarsus of the foot. The heel was drawn down so that the os calcis occupied a vertical position and the superincumbent weight was borne on the end of the bone. The posterior portion of the articular surface of the astragalus could be felt under the tendo Achilles. In fact, the backward pressure of the astragalus was indicated by an elevation, making a visible posterior projection against the tendo Achilles. The foot was rigid in the extreme; dorsal or plantar flexion could be made only to the slightest degree. The phalanges were limp and could neither be voluntarily flexed or extended. The deformity was due entirely to a dense cicatricial mass, involving the skin and all the soft structures and including the periosteum to which it was attached. This scar tissue involved an area beginning at the junction of lower in middle tibial third, surrounding nearly one-half of the leg and extending downward to the middle portion of the metatarsus.

*Treatment.*—After the usual preparation of the operative field the following procedure was adopted: It was evident that a flap must be constructed to cover at least the greater part of the resulting tissue defect, which seemed unavoidable in severing the constricted structures. A pedicle flap, to be turned or twisted so as to fit over the resulting defect in this avascularized tissue, was out of the question. It was evident that a flap with a broad attachment was necessary. The only one available was a triangular flap, so constructed as to cover the tibia astragaloid joint when it should be opened, as it must be, where the scar tissue reached down to and involved the entire

\* Read before the Western Surgical and Gynecological Association at Kansas City.