

various tissues of the body, often produces serious or fatal complications in those who have a gouty diathesis. Because the walls of arteries are weakened by disease and stretched by blood under unusual pressure aneurysms sometimes develop in the smaller or larger arteries. The smaller ones are frequently the cause of apoplexy.

The commonest and most characteristic cardiac change associated with gout is hypertrophy. The left ventricle is chiefly thickened, although when the heart is hypertrophied both ventricles are affected more or less. The cardiac hypertrophy is, without doubt, due to increased work which the heart has to do because of the destruction of some arteries and capillaries and diminished caliber and rigidity of others. These changes in the arteries generally necessitate compensatory cardiac hypertrophy and as the arterial changes become more widely diffused, little by little and intermittently, the cardiac hypertrophy slowly increases so long as the nutrition of the individual is good. Ultimately cardiac compensation becomes impossible, cardiac fatigue, dilatation and exhaustion develop. Endocarditis and pericarditis almost never complicate gout. In this respect the contrast with articular rheumatism is striking. It is true that deposits of urates have been found on the valves in gout, but such cases are extremely rare and exceptional.

These various changes in the kidneys, arteries and heart may occur in podagra or characteristic gout, but are more frequently seen independent of it and often themselves constitute the most marked manifestations of a gouty diathesis.

Treatment, to be of value, must be hygienic. It will aim to prevent the accumulation in the blood of those substances, uric acid or whatever they may be, which produce the vascular, cardiac and renal changes. Necessarily treatment must be continued for a long time. By removing the cause of these complications of gout their progress may be brought to a halt and a patient may be made comparatively comfortable. It is impossible to restore renal tubules and glomeruli which have been destroyed. But it is rare that the renal changes are so extensive that they, of themselves, will prove destructive of life. In almost every instance, when the disease is recognized, enough healthy renal tissue exists so that if its cause is removed the kidneys will continue to do their work fairly well, and maintain a condition of physiologic health even though they are anatomically much deformed. The same can be said of the inhibition of the growing cardiac and vascular lesions by suitable treatment.

CHRONIC INFLAMMATION AND ULCERATION OF THE DUODENUM, WITH RESULTANT REFLEXES.

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The duodenum is abundantly supplied with arterial blood. Its veins empty into the portal vein, any obstruction of which, either from the lungs, liver or heart, produces passive congestion of this organ. Its nervous connection with the brain is by branches from the par vagum and with the spinal cord by branches

from it, with the sympathetic system by branches from the solar plexus, and with the thoracic plexus by the splanchnic nerve. It has within its structure the plexus of Meisner and Auerbach. It is studded with the glands of Lieberkühn and Brunner, and with solitary glands as well as lymphatics. It is the physiologic receptacle of the chyme which is often perverted by functional disease of the stomach or over-repletion, either of which may be highly irritating to the duodenum. It also receives the secretion from the liver and pancreas and performs, possibly, as important a function in the digestive process as does the stomach, and is as frequently subject to physiologic hyperemia. Indeed, there is no structure in the human body which is so often exposed, both internally and externally, to as many varieties of disease-producing forces as the duodenum. It is directly connected with the brain, spinal cord and sympathetic system as no other portion of the alimentary canal is, which fact makes it the great reflex center of this canal.

Careful analysis of a large number of cases of reflex irritation supposed to have originated at other points of this canal, disclosed the fact they always originated in the duodenum. It is far more frequently diseased than one would infer from the scant literature on the subject.

In my clinic at the University Medical College of Kansas City, Mo., 10 per cent. of the cases had chronic inflammation and ulceration of the duodenum. In my private practice the percentage is about the same. As compared with chronic gastritis—or so-called catarrh of the stomach—it is far more frequent. In 17,000 clinical patients I found 666 of duodenal disease, and only one case of chronic gastritis and one of ulcer of the stomach. In fact, I never saw a case of chronic inflammation of the stomach, excluding chemic and other irritants as causative, that did not proceed by extension from inflammation of the duodenum. It is most often found between the ages of 20 and 40, but it frequently occurs in childhood, the result of enterocolitis or cholera infantum. It occurs in females more often than in males because of their more numerous reflexes.

Typhoid fever is the most frequent cause. Other causes are phthisis pulmonalis, functional disease of the stomach, croupous dysentery by extension, the exanthematous fevers, particularly rubeola, acute inflammation of the organ, passive congestion, burns, acute inflammation associated with pneumonia, which obstructs the bile ducts, producing what the older writers called bilious pneumonia, and reflex irritation, the result of disease of the uterus and appendages.

Brown-Séquard asserted years ago that reflex irritation was sufficient to arrest secretion and nutrition, and produce inflammation. This fact is beautifully illustrated in severe burns of the skin, which, by reflex irritation, result in acute inflammation of the duodenum, and *vice versa*, irritation of the duodenum will produce inflammation of the skin, as in urticaria and eczema. In childhood we have a clear example of the effect of irritation of the intestinal canal, producing reflex irritation of the nerve centers, attended with functionary changes in the blood of these centers, thereby producing convulsions.

Esquirol, Pinel, Cullen and others believed and taught that gastro-intestinal irritation was a frequent cause of insanity, yet they were not able to give a reason why this should be so. In the light of mod-

ern science and our knowledge of reflex irritation producing fluctuatory changes in the blood, they were not far wrong, as is illustrated by the following case:

Case 1.—June 10, 1875, Mr. P., aged 35, no hereditary tendency to insanity, a well-to-do farmer, had always enjoyed excellent health until three years before, when he had an attack of typhoid fever with serious bowel complications; during convalescence there was no restriction in his diet, which had much to do in leaving him with a chronic inflammation and ulceration of the duodenum. In 1877 he presented himself to me for treatment. I found him suffering with melancholia, with suicidal tendency, dependent upon reflex irritation caused by chronic inflammation of the duodenum. I placed him under treatment for this disease. As soon as the irritation was controlled he began to improve, and so continued steadily until restored to health.

In the last twenty years I have treated seven other cases of insanity, the causes of which could be clearly traced to reflex irritation produced by disease of the duodenum. Four of these cases were the after-effects of typhoid fever; two of them were from functional diseases of the stomach, and the remaining one was from acute duodenitis, associated with pneumonia, which became chronic.

Epilepsy as caused by reflex irritation.—Statistics show, excluding traumatism, heredity and alcoholism as causative forces in producing epilepsy, more than one half of the cases of this disease begin in childhood. It is my opinion that a very large percentage is the result of reflex irritation caused by chronic inflammation of the duodenum, as is illustrated by the following case:

Case 2.—May, 1870, I was called to see a child 2 years old. *History.*—The previous summer, while teething, he suffered for six or seven weeks with enterocolitis; for five or six weeks before I saw him he had been suffering from unconscious spells of *petit mal*; the day before he had *petit gravior*. Diagnosing epilepsy dependent upon reflex irritation caused by chronic inflammation of the duodenum, I placed him under treatment for this disease and he eventually recovered.

Case 3.—In November, 1880, I was consulted in regard to a child 8 years old, who had begun to have *petit mal* in July, 1880. The disease was now *petit gravior*. There was not sufficient history of intestinal disease to point in that direction for cause, excepting malnutrition, nor was there any hereditary history of epilepsy or neuropathic diathesis. January, 1881, the child died of broncho-pneumonia. Postmortem examination revealed two ulcers in the upper portion of the duodenum surrounded by zones of inflammation.

I have treated seventeen other cases of epilepsy, between the ages of 2 and 17 years, caused by reflex irritation excited by duodenal disease. Those I have seen during the first six months of the existence of the disease have recovered; one at the end of the second year recovered; of those in whom the disease had existed over three years only one recovered, the others were not benefited. I think it is fair and logical to believe that if the cases are seen early a large percentage of them can be cured; but when the epilepsy has existed for more than two or three years, although you may relieve the cause of the irritation, the fluctuatory changes in the blood become a fixed habit, and is more difficult to treat than the primary cause of duodenal irritation; add to this the strong possibility of changes in the structure of the nerve centers, caused by perverted nutrition, the result of the functionary changes in the blood plus habit, and the case then becomes hopeless. In a large majority of the cases of duodenal disease the patient suffers more or less from neurasthenia, but there are cases in which it is the prominent effect of reflex irritation.

Case 4.—Age 34, female, married, mother of four children. Family history perfect; said to have had lacerated cervix uteri, for which she was operated on with the assurance that a cure

of this would relieve her neurasthenia. This was in 1881; she was not benefited by the operation; had had typhoid fever in 1880. I saw her in 1883, when she had suffered from neurasthenia since the middle of 1881. I diagnosed chronic inflammation and ulceration of the duodenum with resultant reflexes. I placed her under a course of treatment and at the end of four months she had entirely recovered.

Pharynx and nasal cavities.—It frequently happens that we find pharyngitis and rhinitis associated with chronic duodenal diseases. I report the following case: Four years ago Prof. J. E. Logan of the University Medical College of Kansas City, Mo., referred a case to me for treatment, with the statement that the rhinitis, which was attended with distressing sneezing, was caused by reflex irritation. On examination of the patient I found her suffering from chronic inflammation and ulceration of the duodenum, caused by long continued functional indigestion of the stomach. I placed her under treatment for duodenal disease only, giving no attention whatever to the nasal or pharyngeal inflammation. She rapidly improved, ceased sneezing within a week, and at the end of four months was perfectly well.

Diseases of the skin.—That urticaria is entirely dependent upon reflex irritation originating in the duodenum can not be doubted. The same is true of many of the forms of eczema, a fact which I have verified in a large number of cases by diagnosing the existence of duodenal disease, the successful treatment of which entirely relieved the skin disease.

Pruritus of the skin.—A case of this disease had been under the treatment of several distinguished dermatologists without relief. I diagnosed chronic duodenal disease following an attack of rubeola producing reflex irritation. The patient was placed under treatment, and as soon as the duodenal disease began to improve, thereby lessening the reflex irritation, the pruritus began to subside, and she was entirely relieved.

In duodenal disease the functional action of the heart is interfered with. It is either increased in frequency and decreased in force or merely decreased in frequency. I have seen it, in different cases, vary in number of strokes from 35 to 120 beats per minute. In many cases the reflex phenomena appear in the lungs, in which there is sighing respiration or asthma. Anemia of the brain is not uncommon. Local hyperemias of the brain with insomnia is also very common.

Over twenty-five years ago my attention was called to the character of food recommended for diabetic persons, which then had no better reason for its use than "that it was best," also to the exclusion of saccharin matter with no better explanation than the above. About that time I treated two cases of pachymeningitis, which were followed by diabetes mellitus caused clearly from irritation or pathologic changes near the fourth ventricle of the brain. I soon learned that opium had no controlling influence in the cases whatever over the amount of urine secreted, differing in this from any case in which I had used it before. Finding later that chronic inflammation and ulceration of the duodenum always preceded all the cases of diabetes mellitus which I treated, I concluded that the real benefit of opium was its controlling influence over peripheral irritation, thereby lessening the reflex influence. My attention was then called to the close relations between this disease and diabetes mellitus. Since that time I have carefully examined more than thirty cases of diabetes mellitus, and found that this disease of the duodenum had preceded every one of

them. Seven of these cases I have verified by post-mortem examinations. In each I found chronic inflammation and ulcerations of the duodenum. There was no other pathologic change of structure except in one where the liver was affected.

It may be a question whether the relation of these two diseases is the result of peripheral irritation producing reflex irritation, thereby affecting the nutrition of the nerve centers that preside over the conversion of starch and other matters into saccharin matter, or whether it is the interruption of the function of the duodenum and its accessories which arrests or prevents normal metabolic and anabolic changes in our food, and by natural selection the defective products of saccharin matter (glucocids) are taken up by the absorbents and depurated by the kidneys.

The principles that should govern the treatment of this disease and its reflexes are as follows: 1. The organ should be given rest from physiologic hyperemias by excluding oleaginous, saccharin and starchy foods; the nutrition of the patient should be maintained by stomach digestion, rectal alimentation and absorption of the skin. The remedies indicated are those which control reflex irritation and intestinal germicides. If there exists anemia of the nerve centers of the brain, it should be relieved by such tonics as nux vomica, strychnia, arsenic; if general or local hyperemias, by bromids. If tonics are indicated, the hyposulphates of lime, soda and potassa, or the bitter tonics. The iron preparations are injurious. In cases of diabetes mellitus add to the general treatment from 15 to 20 grains of bicarb. of potassa after each meal. Purgatives should be avoided, except those that act on the large intestine. These should be alternated with enemias.

DISCUSSION.

Dr. BORDMAN REED of Atlantic City, N. J.—Up to this time I had not been led to believe that there were as many reflexes from the duodenum as my friend Dr. Allen has given us to understand he has found. I should be inclined to question whether all of his cases were true reflexes, and also whether they came from disease limited to the duodenum. I should be strongly inclined to think that most of the cases he has reported were cases of intestinal toxemia from inflammation of the small intestine. In fact, it is very difficult to differentiate disease limited to the duodenum. The duodenum is a very small portion of the intestine, and its structure is very similar to that of the small intestine below, so that I can not understand how Dr. Allen can be certain the disease was limited to that short distance. The great burthen of evidence from other sources would lead us to believe that the results were more from toxemia, the absorption of various toxins, than from reflexes. However, I am inclined to believe that there are also reflexes from that region. I think we are apt to take too narrow a view of disease. Haig, in his famous book on uric acid, attributes nervous diseases to uric acid causes. On the other hand, Bouchard attributes them to toxemias, and others to other things. I think it probable that all of these agents are concerned in the production of nervous diseases.

Other authorities have differed somewhat from Dr. Allen with regard to the relative frequency of diseases of the stomach and intestine, particularly with regard to ulcer. Andral reported the proportion of ulcers in the duodenum and stomach as 1 to 40. Another author gives 1 to 9. Ordinary round ulcer is much more frequent in the stomach than in the duodenum. The duodenum is also liable to the catarrhal type of ulcer, but the usual kind is the round ulcer due to an excess of acid passing down from the stomach. My own studies and experiments on the acidity of the gastric juice have shown me

that a great deal of nervous disease is attributable to an excess of hydrochloric acid in the stomach. The excess of acid may pass into the duodenum and produce irritation, sometimes ulcer, and probably sometimes catarrhal disease. It is a large subject. We should welcome contributions from every quarter, but not be dogmatic in our conclusions.

Dr. ALLEN—The anatomic, physiologic and pathologic points made by me in my paper have not been objected to by my friend Dr. Reed. He objects to the relative frequency of gastric inflammatory processes and those of the duodenum. Answering, I would say that wherever there did exist a question of doubt requiring differential diagnosis between these diseases, the stomach in each case was washed out and its contents thoroughly examined, chemically and microscopically, for the debris of inflammatory processes, which protected me from any possible mistake. The same care was taken in the investigation of the possibilities of the existence of inflammatory diseases below the duodenum, and they were not found. The statement of Dr. Reed that I am not supported by the literature on the subject is true, but he must bear in mind that the literature on the subject is so very meager that I am justified in concluding that investigators have overlooked this very important portion of the alimentary canal. The Doctor attempts to explain some of the phenomena attending these cases by the absorption of toxins. As toxins are never absorbed by normal structure, but only where there are inflammatory processes, there might be a question of doubt as between the causes which produce the phenomena of the cases reported by me. The phenomena themselves can not be explained by the Doctor's theory, but can scientifically be explained by reflex irritation.

DIAGNOSIS OF ASCITES.

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The object of this brief communication is to call attention to a symptom which I think has hardly received sufficient attention at the hands of clinicians and which I know to have been misinterpreted. I allude to tympany in the flanks and its significance in the diagnosis of ascites. It is generally taught that the *absence* of tympany in the flanks is characteristic of ascites; while its presence can not be regarded as consistent with any considerable degree of accumulation of liquid in this region. A case now in my wards at the Hospital of the University of Pennsylvania illustrates the possibility of error arising from a too strict adherence to this guide. A woman, aged 37 years, was admitted with mitral stenosis and insufficiency, with passive congestion, enlargement and tenderness of the liver, ascites and general anasarca. When lying on her back the lower abdomen was somewhat bulging, and over this region and laterally on both sides as far as a vertical line drawn through the anterior superior spinous process of the ilium, distinct fluctuation and a succussion wave could be elicited. Behind this, distinct tympany could be brought out by percussion in both flanks. It was usually more marked on the right side. So marked was the tympany, and so much in contrast with what seemed usual that experienced men who saw her thought that the condition could not be ordinary ascites but must be a collection of fluid, circumscribed by adhesions. A trocar was introduced and seven pints of clear serum drawn off, such as constitutes an ordinary ascites, emptying the abdomen completely of fluid. As the fluid reaccumulated, the original signs appeared and were followed by another tapping, when an equal amount of fluid was drawn off. This was repeated several times.

Having had this experience with the patient referred to, I proceeded to examine carefully every case of