

(2) Samuelson has shown that the blood may be made acid, yet ulceration does not occur.

(3) There is an inconsistency in the doctrine, because an acid juice impinging on an alkaline mucous membrane would either become alkaline itself, and thus lose its digestive powers, or render the mucous membrane acid, in which case the theory would not hold.

It is evident, then, that other factors are necessary in the production of gastric ulceration. What are they?

Let us look briefly at the effect of traumatism of various kinds. Ewald relates the case of an American sailor who, in the course of ten years, had swallowed the whole or part of thirty knives. After death there was found in the stomach thirty pieces of knife blades, together with parts of handles, but no sign of recent or old ulceration. This case shows how much a healthy stomach will stand. Ulceration has, however, been produced by rough sounding, by the ingestion of hot food and drink, by corrosive poisons, by violent vomiting. Ulceration has also followed external violence, a blow or fall. Habershon points out that tailors, weavers, and shoemakers often suffer from this disease, probably due, in part, to pressure on the stomach in the course of their work. Rassmussen, in 1887, found furrows or grooves in the mucous surface of the stomach, produced by the pressure of the costal edges in tight lacing. It is, however, a well-recognized fact that the majority of ulcers produced in this way heal readily, thereby differing from the chronic, in which healing is so slow and relapse so apt to occur.

In view of this, the question becomes not so much what produces these ulcers as what prevents them from healing. In this connection certain experiments on animals are of interest. Schiff produced ulceration by an injury to the anterior corpora quadrigemina. Koch and Ewald did the same by a partial section of the spinal cord. Panum, and afterwards Cohnheim, and many others, by introducing multiple emboli into the gastric arteries. Daettwyler made the observation that ulcers produced in these various ways healed readily, but in cases where the animal was rendered anæmic previously by repeated venesections, or where hæmoglobinuria had been produced by artificial means, the ulcers healed very slowly. This latter observation is one of special interest to us, agreeing, as it does, with our clinical observation of these cases in practice. Gastric ulceration occurs most frequently in young adults suffering from anæmia, or some of its kindred states, and it is very slow to heal.

The course of these ulcers occurring in anæmic individuals may be briefly described as follows: An injury is received by the mucous membrane of the stomach, either by internal or external means. This is generally followed by a follicular hæmorrhage into the stomach wall, which prevents proper nutrition of that spot. The gastric juice acting on this