

PEPTIC ULCER IN INFANTS UNDER ONE YEAR OF AGE

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GASTRIC and duodenal ulcers in infants under one year of age are not so rare as they were formerly supposed to be. The former condition is less frequently encountered than the latter, but the literature is by no means scanty in case reports of both.

Reading the literature for the purpose of gathering data on gastric and duodenal ulcer in infants under one year of age leaves much to be desired. The information regarding age, sex, and diet of infants dying of ulcer is very meagre. Moynihan, for example, Second Edition, 1912, gives sixteen case reports of various authors. Of these, four were female, two male, and in ten the sex was not stated. Many reports giving the case history and autopsy findings will state that the patient was a child, and leave one totally in the dark as to whether the child was a year or six years of age. Very few reports give any indication regarding the diet, and one cannot know whether the infant in question nursed or was fed a formula.

One must exercise care not to confuse true ulceration in infants with superficial necrosis or intestinal decomposition. These latter conditions are prone to occur very soon after death. Unless the area suspected has a definite punched-out appearance with sharp edges, one should hesitate to include the case with those of true ulceration.

The first recorded case is that reported in 1825 by Siebold.¹ It was a perforation of a gastric ulcer in an infant two days old. Hecker and Buhl,² in 1864, reported the first case of duodenal ulcer. Spiegelberg³ reports death from perforation of duodenal ulcers in two infants five and twenty-four hours old, respectively.

Since then the literature is sprinkled with numerous reports of ulcers discovered accidentally in doing a routine autopsy following death due to other causes; or from death due to hæmorrhage or perforation of an ulcer. Rarely is the condition diagnosed previous to operation or death.

Holt⁴ states that in 1800 post-mortem examinations made at The Babies Hospital, 90 per cent. in children under one year of age, ulcer was found only four times—.222 per cent. He does not specify whether these are gastric or duodenal. Compared with most other reports, this is a very low percentage. Schmidt,⁵ for example, in his exhaustive monograph, reports ulcer in 1.8 per cent. of cases in 1,109 autopsies performed on children under one year of age. This is eight times the percentage reported by Holt. Both articles were published the same year.

Schmidt makes the further statement, and quotes figures to prove it, that duodenal ulcer is more frequently encountered during the first year of life than at any other time. This is certainly contrary to the general belief.

Sturtevant and Shapiro,⁶ reporting results on 7,700 autopsies at Bellevue Hospital, found gastric ulcer in five children under one year of age. This is of little statistical value for the autopsies were on individuals of all ages.

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Veeder⁷ reports having seen five cases of duodenal ulcer in infants under one year of age. These were at the St. Louis Children's Hospital. He calls attention to the fact that this condition, when it does occur, is most frequent in the first four months of life.

Butka⁸ says: "Although the literature abounds in reports of duodenal ulcer, the occurrence of gastric ulcer in infants is exceedingly rare. Careful search has revealed only three cases of ruptured gastric ulcer in infants under two months of age." This may be an accurate statement in so far as American authors are concerned. As will be shown later in this paper, there are many such cases on record.

Helmholz,⁹ in 1909, reported nine cases of duodenal ulcer in infants under four months and an additional report of seven cases seven months or under. Four of the latter group had two or more ulcers.

Multiple ulceration either in the stomach or duodenum is not infrequently reported. These may be of the kissing variety, or sufficiently removed from each other and so placed that contact could play no part in their occurrence. As many as five separate and distinct ulcers have been found in the same infant.

Numerous other authors, including Thoms,¹⁰ Kobes,¹¹ Palmer,¹² Billard,¹³ Schwab and Le Bourlier,¹⁴ Somerford,¹⁵ and Stern, Perkins and Nessa,¹⁶ report numerous cases of both gastric and duodenal ulceration.

Rogers¹⁷ reports two cases of duodenal ulceration in the same family—one appearing at seven weeks, and the other at two months. The first case had three separate and distinct ulcers.

Nixon and Fraser¹⁸ report several cases of ulceration at the cardiac end of the stomach. In one case the ulceration completely surrounded the oesophagus. This must be an unusually rare condition, as I find no further reference to it in the literature.

The classic monograph of Theile¹⁹ includes ulceration in children up to sixteen years of age. Extracting those cases that fall within the age limit of this paper, we find case reports on 137 ulcers. Of these there were: gastric, 51; duodenal, 78; location not stated, 5; multiple, 3. His figures show that the greatest number occur during the first few days of life and that perforation is more frequent in gastric than in duodenal cases.

It seems fair to assume that many cases of melena neonatorum have an ulcer basis. Some of these patients recover and a diagnosis is never made. Others die and no autopsy is performed. One has no way to determine the number of ulcers that pass undiagnosed.

In the stomach these ulcers are generally, though not necessarily, situated on or near the lesser curvature. In the duodenum they are practically always on the posterior wall, nearer the papilla than the pylorus.

I shall here add three unreported cases of gastric ulcer:

CASE I.—Patient of Dr. Adolph G. De Sanctis. Female, aged two months, eleven days. Discharged April 12, 1931, for respiratory infection. Re-admitted April 20, 1931, bilateral swelling ear drums. Operation April 20, 1931, bilateral myringotomy. Blood transfusion. Died April 21, 1931, at 5.45 A.M. Autopsy at 9.30 A.M. Inspissation pneumonia; double otitis media. Gastro-intestinal tract—stomach: at the lesser curvature near the pyloric sphincter there were two areas of necrosis surrounded by a zone of marked congestion, each measuring about thirty millimetres in diameter. The two areas merged into one another, and on further dissection revealed two areas of perforation most probably due to handling of this necrotic tissue. The rest of the gastro-intestinal tract was negative. Pancreas negative. Sections of the stomach wall taken around the ulcer revealed marked oedema and extensive polymorphonuclear cell and eosinophilic infiltration of the entire thickness of the wall. There was a large amount of purulent exudation on its outer surface. The mucosa of the stomach wall was gangrenous and exfoliated over the ulcerated area. The tissue beyond the ulcer was

congested and œdematous. The entire ulcerated area and the injected area around the periphery of the ulcer was also extensively infiltrated by a fungus made up of branching filaments and quite a large number of spores. Further discussion with the pathologist revealed the fact that sprue was probably the basis of the ulcers. Microscopical examination.—Diagnosis—inspissation pneumonia; acute gangrenous ulcers of stomach, showing the presence of a large number of segmented, branching, spore-bearing filaments; encephalitis. *Final Diagnosis*.—Bronchopneumonia; acute double otitis media; acute ulcers of stomach.

CASE II.—Patient of Dr. Harold Denman Meeker. Male, aged three months. History.—In spite of every effort, patient vomited persistently for about three weeks prior to operation. There had been great difficulty in feeding him since birth. At operation an ulcer about a centimetre and a half from the pyloric sphincter was found on the anterior surface close to the greater curvature. There had been a perforation, but the opening had been walled off by adherent omentum. A simple closing of the ulcer margins was done, using fine chromic gut, reinforcing the surface by stitching omentum over the peritoneum and then doing a posterior gastrojejunostomy, the surgeon feeling at the time that this operation could be done more rapidly and with less shock than a pyloric operation. Patient made an excellent recovery.

CASE III.—Patient of Dr. Marshall C. Pease. Male, eleven months old. History.—Vomited feedings for several days; this was followed by vomiting of blood; melena; rapid collapse, and death. Autopsy performed within one hour after death showed a perforated ulcer on the anterior surface of the stomach close to the lesser curvature.

With such facts before us, it seems fair to assume that duodenal ulcer in infants under one year of age is certainly not a rarity. Furthermore, with new cases of gastric ulcer constantly being reported, it is reasonable to conclude that this condition occurs much more frequently than is generally supposed.

Like peptic ulcer in the adult, it is, in infants, probably due to a combination of conditions. Anything that lowers general resistance certainly predisposes to whatever the active agent may be. Holt⁴ says: "In sixty-five cases in which the age is given, 70 per cent. occur between the sixth week and the fifth month. This corresponds closely with the age incidence in death from marasmus." Theile¹⁹ stresses the point that a majority of the cases reported by him had one of the numerous constitutional diseases such as marasmus, tuberculosis, syphilis, uræmia, *etc.* Helmholtz²⁰ says: "They have some connection with antecedent wasting illness, for such enfeebled infants more rapidly develop ulcer." Moynihan²¹ says: "In poorly nourished, atrophic infants, ulcer is probably very frequently present."

Thus the normally delicate structures of the infant, having been further enfeebled by some wasting disease, fall an easy prey to a variety of infectious organisms. The work of Saunders,²² while it does not refer to ulcers in infants, is applicable and most illuminating. Rosenow,²³ as well as Gerdine and Helmholtz,²⁴ report clinical and experimental evidence supporting the infectious nature of ulcer. More recently, Kennedy²⁵ has isolated a streptococcus from ulcer. He also finds streptococci and other bacteria in the ulcer tissue but none in the tissues surrounding the ulcer.

Most of the authors quoted herein, particularly Schmidt,⁵ emphasize local thrombosis as a frequent cause. There is no doubt that the thrombus will

cause ulceration, but we must go one step beyond this and relate the cause of the thrombosis.

Traumatism, either in normal or difficult delivery, must be considered as an important factor in the causation of ulcer. Such injury would certainly reduce the resistance of a normal or already enfeebled membrane. It would be prone to slow up the circulation or cause ecchymosis or even thrombosis. The tissues are then an easy prey to bacterial attack. If the condition can take place in tissue hardened to resist trauma, it must certainly occur frequently in the sensitive internal membrane of the enfeebled infant.

The fact that all such ulcers show a complete absence of round-cell infiltration and all other evidence of inflammatory reaction, in other words, that there is only evidence of destruction, none of repair, is no argument against the bacterial theory. There must be present at least normal resistance to stimulate round-cell infiltration and the other reactions to bacterial invasion. These factors are not present in the type of infant most likely to be affected with ulcer.

Unfortunately, the condition is practically never suspected or diagnosed until hæmorrhage or perforation occurs. It is then practically always too late to help. One of the three cases reported in this paper was diagnosed previous to operation by Doctor Meeker, and the result was a happy one. This is the youngest case reported of a successful operation for a perforated gastric ulcer.

Until blood appears, most often in the stool but not infrequently in the vomitus, there is practically no definite sign or symptom upon which an accurate diagnosis can be made. Abt's "Pediatrics," p. 535, quoting Holt, says: "Perforation and hæmorrhage are exceedingly rare." I think the numerous reports herein will successfully refute such a statement. Vomiting or the spitting up of sour fluid is so frequent that one would certainly not suspect ulcer unless there were other more damaging evidence. Realizing, however, that ulceration is frequently found in infants, persistent vomiting should make one suspicious that he may be dealing with an organic lesion. Occasionally symptoms of pyloric obstruction are noted in connection with some hæmorrhage. This should give a clue to the diagnosis, and has been elaborated upon by Finny²⁶ and Helmholtz,⁹ quoting Birk. When, after persistent vomiting with or without blood, plus active melena, there is a sudden collapse, one can be assured that the underlying condition is in all probability peptic ulcer. Even at autopsy the condition is likely to be overlooked, for the ulcer may be very small and obscured by blood or fibrin.

If ulcer is suspected, one can safely resort to the X-ray, which should certainly be regarded as being the best ally in making a diagnosis. I find only two references to the utilization of this method—Stern, Perkins and Nessa,¹⁶ and C. Pedrazzi.²⁷ The first-mentioned authors give a complete case history of a two-day old infant. By means of a catheter, sufficient barium was instilled into the stomach to permit hourly X-ray exposures. The report showed a niche on the lesser curvature near the pylorus.

Little is reported in the matter of treatment. Apparently little need be said. Surgery certainly holds the only hope of a cure. Even with surgery the outlook is none too brilliant. Unless the diagnosis has been made early and surgery resorted to before perforation or massive hæmorrhage has taken place, the prognosis is indeed gloomy. The case reported in this paper operated upon by Doctor Meeker is certainly the exception that, one might say, proves the rule. Repair of the perforation or suturing the ulcer, with arrest of the hæmorrhage done as quickly as possible, offers the best hope for a live patient. In older children, according to Henderson,²⁸ medical treatment is the method of choice.

SUMMARY

(1) Duodenal and gastric ulcer—particularly gastric—in infants under one year of age occur much more frequently than is generally supposed, at least in 1.8 per cent. of cases. With more autopsies and a closer inspection of the viscera involved, this percentage would undoubtedly be greatly increased.

(2) They practically always occur in infants who have some constitutional disease—particularly marasmus. Traumatism and infection are perhaps secondary causes.

(3) Except in rare cases, the diagnosis is never made until perforation or persistent and massive hæmorrhage occurs.

(4) The treatment is early surgical interference.

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