Hemorrhagic Necrosis of the Gastrointestinal Tract

In 1954, Wilson and Qualheim\(^1\) reported 20 instances of a disorder clinically simulating mesenteric thrombosis and occurring principally in elderly and debilitated individuals with chronic cardiac disease. This condition, which they called "acute hemorrhagic enterocolitis," was characterized by abdominal pain, typically sudden in onset and not too well localized, together with frequent and often bloody diarrhea. The average survival time of these patients following the onset of symptoms was slightly over 3 days although recovery from a similar less severe episode appeared to have occurred in one patient 6 weeks prior to death. At autopsy, lesions were found to be widely distributed in segmental fashion through the intestinal tract from stomach to anus. The affected bowel was usually dark red or purple, due in part to accumulated blood in the lumen; the serosa was congested but showed no evidence of peritonitis. The bowel mucosa showed intense hemorrhage ranging from scattered patches in mild cases to involvement of long segments of intestine with shallow mucosal ulcerations in the more severe. Histologic findings ranged from widely dilated capillaries with a few extravasated red cells to intense hemorrhagic destruction of the mucosa, affecting particularly the superficial portions and associated with marked submucosal venous dilatation.\(^2\) Of particular interest was the sparing of the muscular and serosal layers and the sparse inflammatory reaction, except in ulcerated areas; both of these findings, together with the segmental pattern and demonstrated patency of the mesenteric vessels in every case, served to distinguish the lesion from intestinal infarction due to vascular occlusion.

During the past 10 years, descriptions of this condition appearing in the literature under a variety of names\(^3-5\) attest to its comparative frequency. The lesion has also assumed significance as a cause of abdominal symptoms and intestinal bleeding, particularly in patients dying with severe cardiac disease attended by shock. The absence of occlusion of the larger mesenteric vessels has been repeatedly stressed, as has the occurrence of similar lesions in the noncardiac patient. Most recent authors, however, recognizing the paucity of inflammatory elements, have preferred to avoid the implication of the term enterocolitis and have substituted less specific descriptive names such as hemorrhagic necrosis\(^2\) or hemorrhagic enteropathy.\(^3\) As the pathologic nature of the process has become more clearly delineated, it has also become apparent that numerous descriptions of this lesion had been recorded well before 1954. Some cases of enteritis necroticans\(^6\) and many instances of so-called pseudomembranous enterocolitis, some of which antedate the introduction of antibiotics, may well represent variants of the same process. An unknown

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number of cases of intestinal infarction, both reported and unreported, should also, in all probability, be included in this category; the occurrence of patent mesenteric vessels in such instances has often been attributed to lysis of a thromboembolus, to the fact that a thrombus or embolus was overlooked, or to vasospasm.5

Elsewhere in this issue, Ming, reporting a series of 75 cases of hemorrhagic necrosis observed at autopsy over a 7-year period, describes further the pathology of the lesion and provides additional insight into its probable pathogenesis. All but one of his cases showed evidence of heart disease or shock and many showed evidence of both. Fatal infection, present in one fifth of the cases, was presumed to play an important contributing role. The common denominator appears to be a sharp decrease in flow through the intramural vessels of the gastrointestinal tract, producing focal ischemic damage. This slowing of flow through the splanchnic bed is a feature common to the various conditions known to be associated with hemorrhagic necrosis and is, as Ming points out, an integral part of the complex phenomenon known as shock. Such changes have, in the past, been widely attributed to vasospasm largely on empirical grounds, but there is now an increasing body of experimental evidence to indicate that resistance in the hepatic and mesenteric circulations is increased in shock states, apparently due to vasconstriction.7 Whether this vasospasm is primary or secondary is not always apparent; sympathetic stimulation as has been proposed in the case of endotoxic shock8 or compensatory response to hypotension and diminished perfusion pressure as in heart failure9 are two suggested mechanisms. In any case, the combined effects of vasocostriction, diminished cardiac output, and severe passive congestion are capable of producing serious local tissue anoxia and resultant necrosis followed by extravasation of blood from congested vessels or reentry of blood into necrotic areas following the eventual loss of vascular tone. The fibrin and platelet thrombi often found in the smaller vessels of these cases and considered by some investigators10 to be an important factor in the pathogenesis, do not seem, to Ming at least, adequate to explain the phenomena observed. Thrombosis is a prominent feature under some experimental conditions, however, and, when present in association with the slow flow and blood sludging that accompany shock, must certainly contribute to the ischemia. All these alterations very closely resemble those of the local Shwartzman reaction, and at least some cases of hemorrhagic necrosis may well represent an intestinal manifestation of this phenomenon in man.

The frequent occurrence of hemorrhagic necrosis in patients with severe cardiac disease has raised the possibility that some of the pharmacologic agents commonly used in treatment may also be implicated in the pathogenesis of the lesion. Mercurial diuretics have been largely excluded as significant factors1 but constrictive effects on the portal and hepatic veins have been attributed to digitalis, especially after excessive digitalization.4 The occurrence of the lesion in patients who have not received digitalis or who present no evidence of cardiac disease casts doubt, however, on the role of digitalis except as a possible potentiating agent. Epinephrine and norepinephrine are also reported to produce vasoconstriction of the mesenteric vascular bed11 especially in the presence of shock.12 Lesions resembling hemorrhagic necrosis have been induced experimentally by the intraperitoneal injection of epinephrine18 as well as by intravenous bacterial toxins.14-16 The evidence strongly suggests that, while these agents do not necessarily cause, they tend to augment the gastrointestinal ischemia. Under such circumstances, the free use of vasopressor drugs may not only make the bowel lesions considerably worse, but may, in fact, be instrumental in converting a subclinical into an overt clinical lesion. That such lesions can evolve with extreme rapidity is demonstrable in patients who present well-developed lesions at autopsy less than 24 hours after laparotomy revealed a grossly normal bowel.2
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The problem is magnified by the fact that hemorrhagic necrosis appears to be considerably more common than was at first supposed. Ming reports an incidence of 4.8 per cent in an autopsy series of which about 45 per cent is made up of cardiac patients. It is probable that the focal hemorrhages and areas of congestion seen so commonly in the gastrointestinal mucosa at autopsy may well represent the milder manifestations of the same pathogenetic mechanisms that produce the more severe lesions. Nor can it be assumed that all such lesions are necessarily terminal; evidence is proliferating that some of these lesions may be reversible, as demonstrated by occasional patients the course of whose disease is unexpectedly prolonged, by the identification at laparotomy of characteristic hemorrhagic lesions from which the patient recovers spontaneously, or by observation of mucosal regeneration in the bowel at autopsy. The rarity with which an antemortem diagnosis is made at the present time, however, effectively precludes any reliable estimate of its actual occurrence in the patient population, much less the frequency with which healing occurs.

The need for such diagnosis is by no means academic. Not only does the likelihood that the vasopressor drugs may exaggerate the severity of the lesion warrant some caution in their use when hemorrhagic necrosis is suspected or considered likely to occur, but the specter of unnecessary laparotomy not likely to be well tolerated by the patient also looms large in the more severe cases. A high index of suspicion on the part of the physician, particularly in cardiac patients, should serve to prevent a certain number of laparotomies; in the rest, an awareness of the pathology of the condition, its peculiar segmental character, the presence of pulsating mesenteric vessels and, in particular, the characteristic absence of serious exudate should serve to give the informed surgeon pause before an unnecessary bowel resection further complicates the patient’s precarious state.

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References

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