Aneurysm of the Abdominal Aorta

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ANEURYSM of the abdominal aorta is a relatively rare condition. It was first described by Vesalius (1) in 1557. A survey of the current literature on this subject reveals a number of single case reports and a few reviews. The incidence of this condition in hospital records is extremely low, ranging about 0.053 per cent. The necropsy incidence however is much higher, ranging about 0.175 per cent. The abdominal constitute 11.8 per cent of all aneurysms. The total number collected 233 cases, and Kampmeier (8) in 1936 brought the number up to 381.

The majority of cases occur in the negro race, because of their high incidence of syphilis. In 335 cases there were 292 males and 43 females.

Three types of aneurysms are recognized: the saccular, fusiform and dissecting. In 34 of 38 cases of abdominal aneurysm, Lucke and Rea (4) found that 30 were saccular, 3 fusiform and 1 of the dissecting types. Aneurysmal sacs vary in size, may be either small or large. The majority, however, are quite large when recognized. An unusually large sized tumor mass may at times be visible on inspection of the abdomen. The ability to disclose the aneurysmal mass varies according to its size and position. When the

ability to improve the inhibitory effect of lactic, acetic and hydrochloric acids.

The bacteriostatic effect of pectin seems to vary with its source. Apple pectin is just as effective at a pH of 4.6 as citrus pectin is at a pH of 4.36. The fact that pectic acid, a purer form of pectinous material than pectin, is ineffective at a pH of 4.6 (although the amount of pectic acid required to produce a pH of 4.6 is less than that of apple pectin) while apple pectin is, would seem to indicate that the effectiveness of the latter material was due to some attached substance. At a pH of 5, apple pectin had lost some of its effectiveness while “non-acid pectin” was quite potent although an amount smaller than that of apple pectin was required to produce a pH of 5.0. It would seem therefore that the effectiveness of “non-acid pectin” and apple pectin is largely a matter of pH, the former having its maximum activity at a pH of 5.0 and the latter at a pH of 4.6. When the various pectin preparations were made up in a two per cent solution, “non-acid pectin” produced the lowest pH (4.36). When these solutions were brought to a pH of 4.85 and 5.0 by the addition of K2HPO4, more had to be added to the “non-acid pectin” than to apple pectin. Nevertheless, in all instances, the bacteriostatic effect was lost. Adding enough phosphate buffer to produce a pH of 5.0 caused even a greater loss. This is a striking effect when it is recalled that “non-acid pectin” at a pH of 5.0 was very effective as a bacteriostatic agent. The explanation of this effect is not apparent unless it be connected in some way with the effect of the potassium or phosphate ions upon the active part of the pectin complex.

The fact that “non-acid pectin” is most effective at a pH of 5.0 and apple pectin at a pH of 4.6 indicates the possibility that the active factor associated with pectin is not the same in both instances. Furthermore, the effectiveness of “non-acid pectin” (nickel pectinate) at a pH of 4.36 was not as great as that of apple pectin at a pH of 4.6. The effectiveness of apple pectin at various hydrogen-ion concentrations deserves more study.

SUMMARY AND CONCLUSIONS

1. Of the organic acids present in the intestinal contents of animals fed fruit supplements, butyric acid has the greatest bacteriostatic effect.
2. The bacteriostatic action of butyric acid is not entirely dependent upon the hydrogen-ion concentration.
4. “Non-acid pectin” was found to be bactericidal at a pH of 5.0-5.5 but the other pectins tested were not.
5. As the pH was lowered to 4.6 apple and citrus pectin became more bactericidal than the “non-acid pectin.”
6. Pectic acid was less inhibitory than pectin at the same pH.
7. Solutions of the various pectins brought to a pH of 4.85 and 5.0 by K2HPO4 lost their bacteriostatic effect.
8. Dehydrated apple powder has no bactericidal or bacteriostatic action at a pH as low as 4.6. The removal of alcohol soluble materials from the apple did not improve the anti-bacterial effect in vitro.
9. The possibility is discussed that the bactericidal effect of such food materials as the apple in the intestine is not so much due to substances contained in them as to factors derived from them by enzymic action. There remains in addition the possibility that certain inorganic elements present may be effective and that pectin under certain conditions such as an optimum pH may exert an inhibitory or destructive effect upon bacterial growth.

REFERENCES

Aneurysms may occur in any portion of the abdominal aorta. They are most commonly observed in the upper segment of the aorta near the celiac axis. The site of the aneurysmal mass is usually limited by the vertebra and liver, so that nearly all abdominal aneurysms are situated on the left side.

Calcification of the abdominal aorta and calcification of the aneurysm may be observed in some instances. The calcified plaques may outline the aneurysmal sac clearly. In Kampmeier's 68 cases only 3 revealed a calcification of the sac of the aneurysm. In 80 cases of intra-abdominal aneurysms of all types, Mills and Horton (6) found 5 instances with calcified deposits in the aneurysmal sac.

A highly important and not uncommon roentgen finding in this condition is the erosion of the vertebra by pressure of the aneurysmal sac upon the spine. The number of vertebra involved vary, but two or more bodies are commonly affected. The region most often involved lies between the 12th dorsal and 3rd lumbar vertebra. The 12th dorsal and 1st lumbar vertebra are the two most often involved. An interesting phenomenon, characteristic of this condition is the lack of involvement of the intervertebral disc. The disc is rarely affected in the erosive process until very late in the course of the disease. The absence of disc involvement produces a characteristic pressure deformity of the bodies of the vertebra in the form of a saucer-shaped mid-portion or scalloping. The superior and inferior margins of the body adjacent to the discs are usually intact. The erosion is smooth and clear-cut and varies from a slight pressure defect on the anterior surface to an extensive deformity involving as much as one-half of the body of the vertebra. Ordinarily the erosive process continues until a deep excava- tion is made producing a crescent shaped deformity. It has been pointed out that the preservation of the disc is attributed to the resiliency of the cartilage. The incidence of spinal involvement varies, but it is said to be quite large. In 24 of Kampmeier's 68 cases in which studies of the spine were made, 18 or 75 per cent of these yielded evidence of erosion of the vertebra. Vertebral erosion may be so marked as to cause compression of the spinal cord. Gregory (8) emphasized that compression of the spinal cord as a complication of abdominal aneurysm has received but too little attention. Weingrow and Bray (9) report a case of abdominal aneurysm in which lipoidol injected

Aneurysm arises from the anterior wall of the aorta, the tumor mass is detected by its expansile, pulsating characteristics, while those arising from the posterior wall present greater difficulty in palpating, except when they are very large in size. In our two cases, one was very small and not palpable, the other was very large and palpable. The mass is frequently expansile, a sign which is more or less pathognomonic of this condition. According to Osler (5), the presence of an expansile tumor mass in the abdomen justifies a diagnosis of an abdominal aneurysm. However, it must be emphasized that all aneurysms do not pulsate, and one must rule out the possibility of transmitted pulsations.

Fig. 1, Case 1. A 24 hour gastro-intestinal roentgenogram demonstrating an abdominal aneurysm situated mesially, adjacent the 2nd and 3rd lumbar vertebra at arrows A. Note the calcification of the abdominal aorta at arrow B. The psoas muscle is clearly visible, can be seen through the sac.

Fig. 2, Case 1. Lateral view of abdomen, the aneurysmal sac is shown at arrows A. Calcification of the abdominal aorta is demonstrated at arrows B (retouched). The lumbar vertebra do not show evidence of pressure erosion.