

DR. H. G. WETHERILL—It is not possible to listen to a paper of this kind without having some misapprehension as to the exact field it proposes to cover. That has occurred, apparently, in the mind of almost every one who has discussed this one. Dr. Carstens seems to have lost sight of the fact altogether that the two cases reported were operated on for retinal hemorrhages and albuminuric retinitis, which are accepted as a justification for immediate delivery by every obstetric authority. In regard to the degree of dilatation that is necessary: The ordinary Bossi instrument measures $1\frac{3}{8}$ inch across the end which is introduced, and it is circular, so that its circumference is something more than three inches. If, then, it is possible to use the Bossi dilator in any case, it is also possible to use the Sims specula, as I have advocated their use on this occasion. As to the hand: We all acknowledge that absolute sterilization of the hand is impossible, and that there is always a residuum of infection that goes with the hand into the vagina and which the tissues and secretions must take care of. We know how impossible it is to cleanse the hands and keep them clean throughout an entire obstetric operation, notwithstanding the fact that these cases often are seen in the hospital, under the most favorable circumstances, so that the hand always carries with it a certain danger, which is not carried by smooth, polished instruments. Dr. Bacon also had a misapprehension in regard to a very specific direction given in the paper. I did not say that a vulsellum forceps should be used to grasp the anterior lip. I said that the upper outer quadrants of the cervix should be grasped with forceps and drawn down until the specula could be introduced, and then the forceps be taken off, thus avoiding the possibility of a laceration of the cervix. It is very easy to listen to a paper of this kind, which presents only simple methods, and offer theoretical objections. I say simply this: Here is a method which has served me admirably; it may serve some of you a good turn at some time, and I am glad to suggest it to you, so that if opportunity occurs you may try it. It must be remembered that the obstetric and gynecologic specialist is not the only person to be considered. General practitioners often require methods which Dr. Carstens or Dr. Bacon might not think of using, and while this method may not appeal to Dr. Carstens, it may find a field of usefulness in the hands of some other practitioner, who may save a life with it. Perhaps I may be permitted to remind the Section that Dr. Oliver Wendell Holmes once wrote an essay on the contagiousness of puerperal fever. The rather conservative body of medical men whom we now represent were a generation in grasping and accepting the opinions which Dr. Holmes promulgated in 1844. It was more than fifty years before his views were practically applied. That is a sufficient commentary on your tendency to criticize severely certain things, while, on the other hand, you grasp at others, principally operative measures, with great avidity.

ANEURISM OF THE INNOMINATE ARTERY.*

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PHILADELPHIA.

My interest in aneurism of the innominate artery was stimulated by a case which came under my observation in the medical dispensary of the University Hospital in December, 1901. After studying the symptoms and physical signs of this case for several months, I presented the patient before the medical society of the University of Pennsylvania, and my diagnosis was very generally concurred in.

It must be admitted, however, that "experience is fallacious and judgment difficult," and that in the last

analysis we must go to the postmortem room for confirmation of such diagnoses. I, therefore, proceeded with the study of my subject there, and was able to collect eight cases.¹ In but one instance in this series, and in that case only tentatively, had the correct diagnosis been made, and the question naturally presented itself as to whether there existed in these cases such clinical obscurity as to warrant this apparent difficulty in diagnosis.

Proceeding, therefore, further in my study with the idea of at least satisfying myself on this point, I had recourse to the literature of the subject; and after collecting and analyzing in all 147 cases of these interesting morbid growths, where, in many instances, the correct diagnosis had been made clinically, a more definite clinical picture formulated itself which I have the honor to present herewith.

ANATOMY.

Before taking up the subject proper of this paper it will, perhaps, be well to review briefly the anatomic features involved. The accompanying chart (Fig. 1) shows well the relation of the arch and its great vessels to the chest wall. It will be seen that the arch² of the aorta begins from the upper part of the left ventricle opposite the lower border of the third costal cartilage, behind the left half of the sternum, and passes obliquely upward, forward and to the right, in the direction of the heart's axis, as high as the upper border of the second right costal cartilage. This is the ascending portion of the aorta, and is covered by the pericardium. From this point the aorta passes backward and to the left, to the left side of the lower border of the fourth dorsal vertebra. This is the transverse portion or arch and it is from this portion that the innominate artery and the left common carotid and subclavian are given off. The aorta from this point passes downward, lying in close proximity to, and to the left of, the spinal column, to the aortic opening in the diaphragm in front of the last dorsal vertebra (descending portion), where it becomes the abdominal aorta.

The innominate artery, its axis and position being well shown in the chart, is the largest of the three vessels arising from the arch. It arises from the lower portion of the arch, opposite the first intercostal space behind the left half of the sternum in front, or the fourth dorsal vertebra behind. It ascends obliquely to the right sternoclavicular articulation, where it divides into the right common carotid and right subclavian arteries. It varies from one and a half to two inches in length. The axis of this vessel is approximately that of the heart, and follows a line from the middle of the sternum opposite the lower border of the third costal cartilage to the right sternoclavicular articulation.

In front it is separated from the first bone of the sternum by the sternohyoid muscles, the remains of the thymus gland, the left innominate and right inferior thyroid veins which cross its root, and sometimes the inferior cervical cardiac branch of the right pneumogastric. Behind, it lies on the trachea, which it crosses obliquely. On the right side is the right innominate vein, right pneumogastric nerve, and the pleura; and on the left side, the remains of the thymus gland, the origin of the left carotid artery, the left inferior thyroid vein and the trachea.

1. Trans. Phila. Path. Soc., vol. i, p. 42; vol. v, p. 103; vol. vii, June, 1904, p. 190.

2. For a masterful and complete description of the anatomic relation of the aorta and its branches, together with a full account of anomalous conditions, see Krause's article in Henle's Anatomy, vol. iii, p. 203.

* Read at the Fifty-fifth Annual Session of the American Medical Association, in the Section on Practice of Medicine, and approved for publication by the Executive Committee: Drs. J. M. Anders, Frank Jones and W. S. Thayer.

The innominate artery does not usually give off any branches, but occasionally a small branch, the middle thyroid, is given off from this vessel. It also sometimes gives off a thymic or bronchial branch.

When the bifurcation of the innominate varies from the point above mentioned, it sometimes ascends a considerable distance above the sternal end of the clavicle; less frequently it divides below it. In the former class of cases its length may exceed two inches, and in the latter be reduced to an inch or less. When the aorta branches over to the right side, the innominate is directed to the left side of the neck instead of the right.³

PHYSICAL SIGNS AND SYMPTOMS.

The position of these aneurisms is, perhaps, their most striking clinical feature. Corresponding to the position and axis of the innominate artery, these growths are situated at the root of the neck, more on the right side than on the left, and frequently extending above the right clavicle and suprasternal notch. They point behind the right sternoclavicular articulation, to the inner side of the sternocleidomastoid muscle, often dislocating the sternal end of the clavicle where their pulsation can be distinctly felt. For an aneurism of the aorta to reach so high, it must have attained great size, or else there must be an anomalous position of the arch itself. In either event there is wanting another distinctive sign of aneurism of the innominate, namely, an angle of re-entry on the external and inferior aspect of the growth, in or above the second interspace. This angle of re-entry, to which attention has not been previously called, separates aneurism of the innominate artery from those of the ascending or transverse arch, which so frequently point in the second interspace to the right. When the aneurism is so large as to involve the arch itself, this angle of re-entry is not an available sign. It is not common, however, for these growths to attain such size as to involve the arch in their growth, unless they originally spring therefrom. They usually are not larger than a lemon, though they may be as large as an orange and reach to the cricoid cartilage, or even attain still greater dimensions as in a case reported to the Philadelphia Pathological Society by Dr. Robertson,⁴ in which the aneurism was as large as a fetal head.

These aneurisms vary in size from time to time, increasing and diminishing quite remarkably. They nearly always dislocate, to a greater or less extent, the sternal end of the right clavicle, which is elevated by each pulsation of the tumor. They are more superficially placed than aneurisms of the arch, and consequently the evidence of their aneurismal nature is, as a rule, readily demonstrated. They can always be palpated above the right sternoclavicular articulation and in the suprasternal notch. In this latter situation the expansile character of the pulsation, as well as a thrill, diastolic shock and bruit, may be easily appreciated; while often they are accompanied by a marked tracheal tug, being usually adherent to the trachea.

In fully one-half the reported cases the trachea was compressed, producing cough. This may be dry, brassy and frequent, or paroxysmal and associated with hoarseness and aphonia. In a majority of the cases there was a mucopurulent expectoration and sometimes traces of blood.

3. The above anatomic description is taken principally from Gray. The chart is original.

4. Trans. Phila. Path. Soc., N. S., vol. ii, p. 269; vol. xviii, p. 220.

Dyspnea in nearly all cases is a marked symptom. It is usually for this, or pulsation and pain at the root of the neck, that these patients seek medical advice. The pain complained of may be dull and aching, and confined to the sac itself, or sharp and lancinating like an angina pectoris, but referred entirely or almost wholly so to the right side of the neck and shoulder. These patients may be free from pain much of the time, and they frequently have very good days, when the size of the tumor is reduced and the dyspnea and pain have almost disappeared. Again, they may suffer greatly, the pain and dyspnea being made worse by emotion, bodily exertion or temporary ill health.

Edema, particularly affecting the right side of the face and neck, may be a symptom. The right side may be colder than the left, and rarely, numbness and even paralysis in the right arm supervenes from pressure. The right external jugular vein often stands out turgid and prominent, and a slightly darker hue is noted over the right side of the neck from venous stasis.

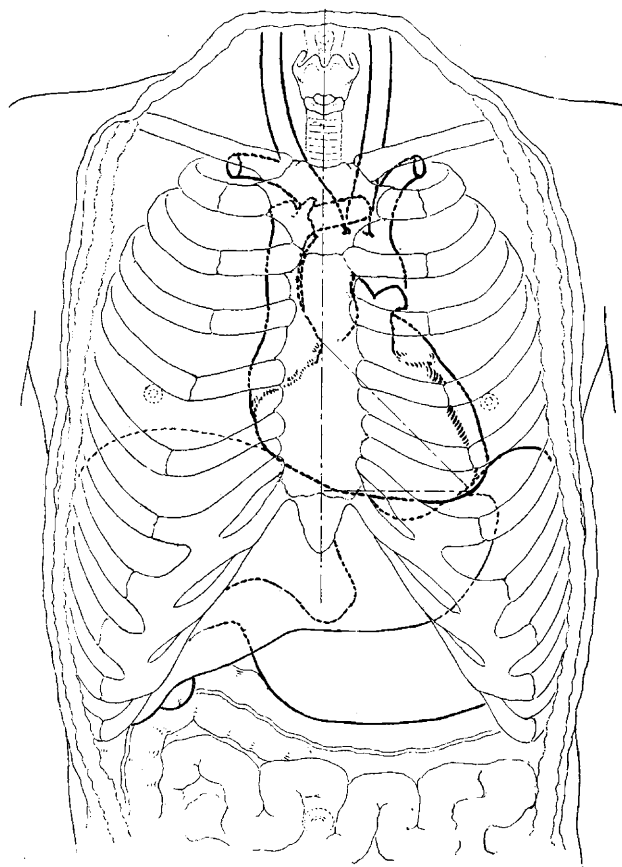


Fig. 1.—Chart showing relation of the arch of the aorta and the great vessels to the chest wall.

Dysphagia is not a frequent nor a marked symptom, having been noted in not more than a quarter of the cases. Curiously enough, as the aneurism increases in size, this symptom, if present at first, is apt to grow less or even disappear, because the tumor in its growth extends upward and outward, pushing the clavicle before it and freeing itself from the resistance offered by the sternum.

Inequality in the radial pulse is usually readily demonstrable, the right being the weaker. Pulsation in the subclavian, axillary, brachial, carotid and temporal arteries on the right is less marked than in the corresponding arteries on the left, or it may be altogether absent. The latter is particularly apt to be the case in

the right temporal artery, which seems, in many cases, to be more affected than even the right radial. There may be noted in some cases a lengthened interval between the heart's systole and the stroke of the pulse in the right radial, which is very suggestive; and in my own case I noted a peculiar regurgitant quality in the right pulse at the wrist which was absent in the left. This difference was well shown in a sphygmogram, and was very suggestive. It might possibly be due to the position of the aneurismal sac, which, not being continuously distended with blood, may act in a measure like or be considered analogous to a diminutive heart with incompetent valves. If this quality of the pulse is present in aneurism of the arch, it is apt to be felt in both radials.

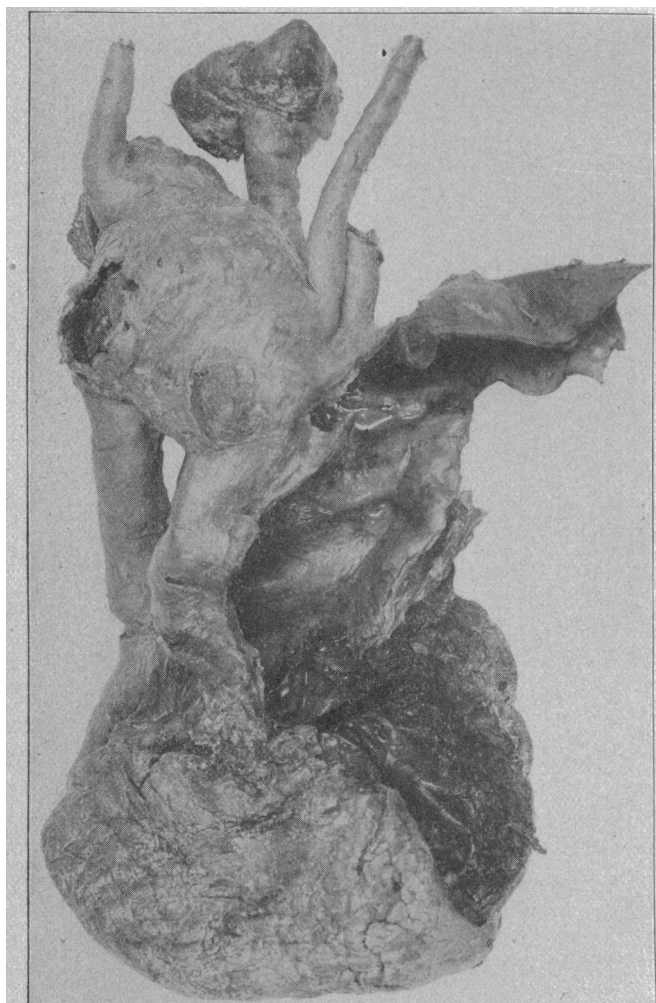


Fig. 2.—Philadelphia Hospital case. Aneurism of arch of the aorta.

The auscultatory signs over these aneurisms, except in their higher position, are not distinctive. There may be a systolic murmur of variable intensity transmitted into the vessels on the right side and accompanied by a thrill. More rarely a double murmur is heard, usually associated with disease of the aortic valves.

There are certain respiratory signs, to which I wish to call attention, which have not been heretofore described in this connection. These result briefly from the compression exerted by the aneurism on the apex of the right lung, and consist in an area of impaired resonance with increased tactile fremitus, and diminished or distant breath sounds, immediately adjoining the tumor;

while adjacent to this area of compressed lung is an area of hyper-resonance with diminished tactile fremitus due, no doubt, to vesicular relaxation.

DIFFERENTIAL DIAGNOSIS.

Some of the more striking differences between aneurism of the innominate artery and aneurism of the arch may thus be briefly summarized: In nearly all cases of aneurism of the innominate there is a more or less pronounced external tumor on account of the more superficial position of the growth. The higher position of this tumor in innominate aneurism is significant, reaching into or above the suprasternal notch and behind or above the sternal end of the right clavicle. The latter is usually dislocated and pulsates with each beat of the heart. The larynx or trachea is more apt to be dislocated or compressed in aneurism of the innominate than in aneurism of the arch, but the esophagus is not so often compressed in the former as in the latter condition. Venous congestion, if present, is more apt to be general in aneurism of the arch, while involving the right side in innominate aneurism. The dyspnea is greater and the alterations in voice apt to be more marked in innominate aneurism.

The pain in aneurism of the arch is lower down, over the middle or lower sternum, and transmitted to the left or bilaterally like an angina pectoris. In innominate aneurism it is referred to a region higher up, corresponding to the aneurismal sac, and transmitted to the neck, shoulder and arm on the right side. Edema or impaired sensation, numbness or loss of power confined to the right arm is very suggestive of innominate aneurism. It is more apt to be general in aneurism of the arch. Pressure symptoms from involvement of the right sympathetic or right recurrent laryngeal nerves, while not rarely present in innominate aneurism, are not in themselves distinctive.

Rarely both signs and symptoms are remarkably indefinite, especially where the growth is small, or occasionally when the aneurism springs from the arch, as in a case reported to the London Pathological Society by Christopher Heath,⁵ in which the "inner end of the right clavicle was thrust forward and the interclavicular notch obscured and the aneurism had perforated the sternum close to the sternoclavicular joint." In the belief that it was an aneurism of the innominate artery, the right subclavian and right common carotid were ligated. The aneurism subsequently ruptured and the innominate artery was found healthy; the sac of the aneurism sprang from the ascending arch of the aorta.

When these aneurisms involve the arch, or in those rare instances where both the arch and the subclavian artery is involved,⁶ the clinical picture of uncomplicated innominate aneurism is not presented.

In conclusion, it may be said that a delayed and weakened beat in the right radial, absence of pulsation in the right temporal, a turgid external jugular, in association with paroxysmal attacks of dyspnea and pain at the root of the neck, or referred to the right side, are all very suggestive of innominate aneurism. The two signs to which I would like to call special attention, and which, so far as I am aware, have not been described before in this connection, are the regurgitant quality in the right radial pulse and the angle of re-entry in the second interspace. The presence of these

5. Trans. London Path. Soc., vol. xxi, p. 132; vol. xxv, p. 117.

6. Trans. London Path. Soc., vol. xlii, So.

in association with the signs of aneurism in the supra-sternal notch and behind the right sternoclavicular articulation are pathognomonic of innominate aneurism.

PROGNOSIS AND TREATMENT.

As a rule, unless relieved by operative measures, these aneurisms sooner or later rupture. A very rare occurrence is spontaneous organization of the clot.⁷

Operative measures are not unattended by danger,

particularly valuable on account of the dangers attending operation *per se*, while later statistics seem to show that it has been attended by recovery and cure in more than three-quarters of the cases.

The operation consists in distal ligation of the right common carotid and subclavian, one or both, either consecutively, if it should prove necessary, or at the same time. This procedure was first suggested orally by Brasdor of Paris, but the operation itself was never performed by him, so that it has come to be associated with the name of Wardrop of London, who performed it in several cases of innominate aneurism.

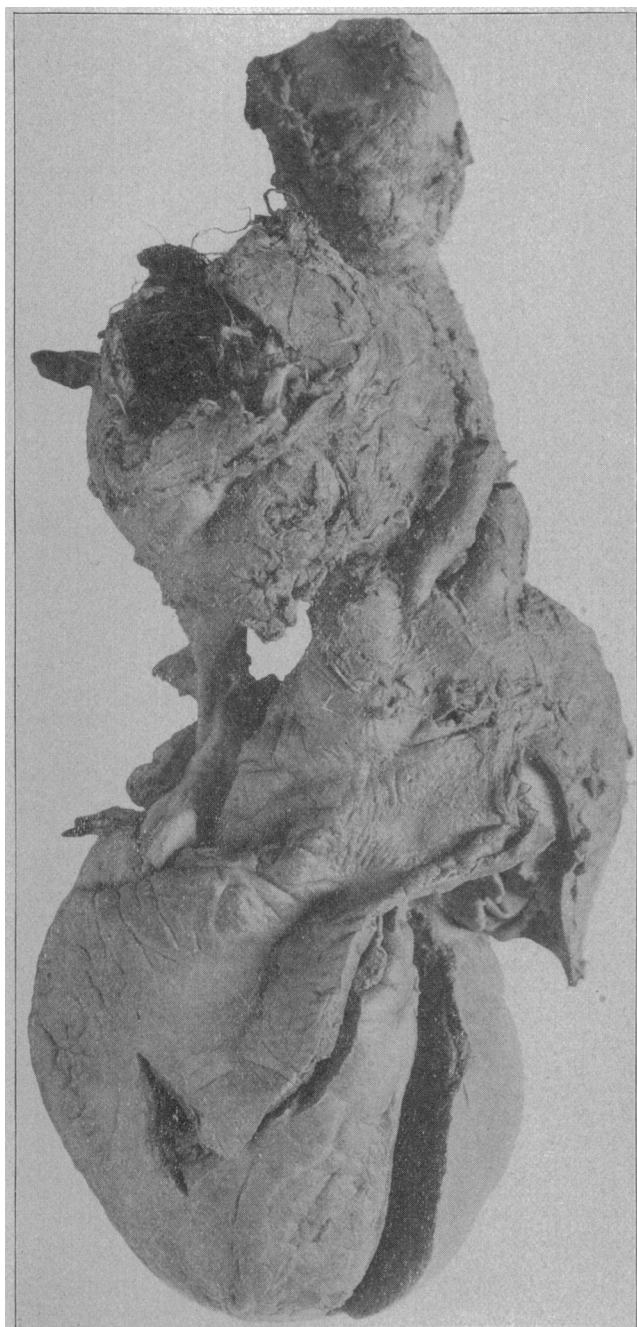


Fig. 3.—Episcopal Hospital case. Aneurism of the arch of the aorta.

which has been much reduced since the introduction of asepsis and modern surgical methods. It is always well to try palliative treatment at first, consisting in measures directed to reduce blood pressure and favor coagulability of the blood, aided by distal pressure. The earlier statistics of distal ligation for these growths are not

7. Trans. London Path. Soc., vol. ix, pp. 95, 167.

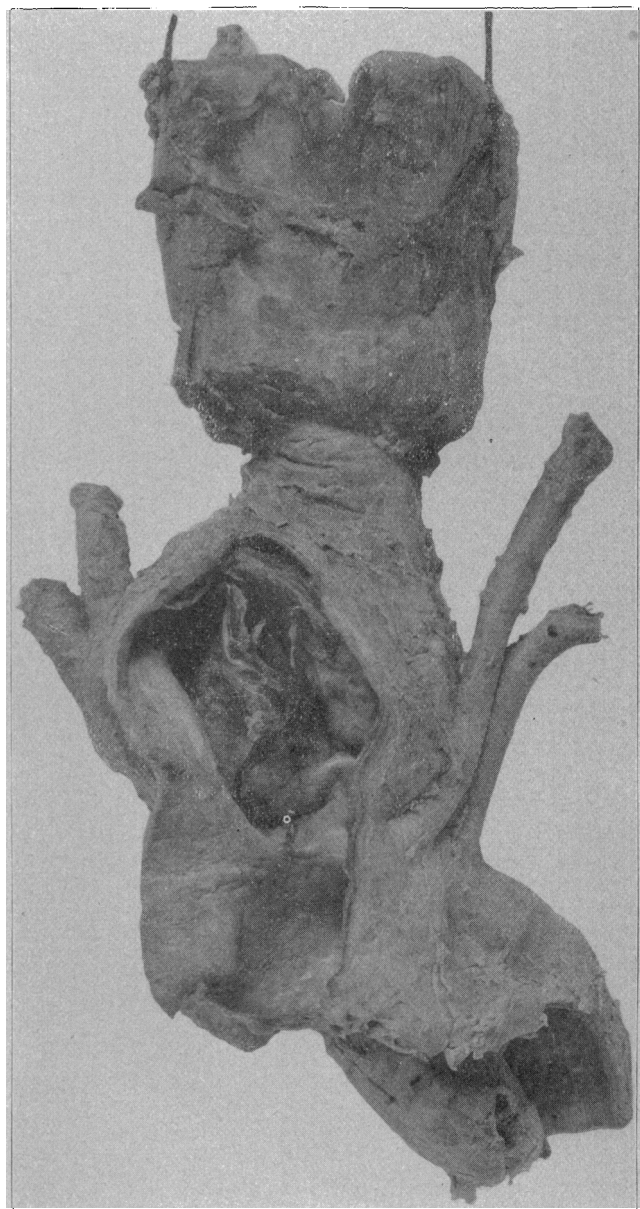


Fig. 4.—Pennsylvania Hospital case. Aneurism of the arch of the aorta.

In uncomplicated cases it has proved highly successful, the sac becoming speedily obliterated by organized clot. When the aneurism is more extensive and involves the arch of the aorta, this operation is not unattended by danger from the extension of the coagulum into the lumen of the aorta, thus blocking off the circulation. This accident happened in a case reported to

the London Pathological Society,⁸ death ensuing on the sixth day after the operation.

In regard to the literature, reference must be made to Holland's Monograph⁹ on "Aneurism of the Arteria Innominata," in which he collected a series of 46 cases from a review of the literature to date. Since that time several statistical papers have appeared on the subject, notably that of Wyeth,¹⁰ in 1881, and of Rosenstern,¹¹ in 1886. Winslow¹² followed in 1893 with an extensive paper dealing with the symptomatology of these growths and their operative treatment. He made use of Wyeth's and Rosenstern's statistics, and collected in all 83 cases, 10 of which were included in Holland's paper, which seems to have escaped him.

I found 11 cases in the Transactions of the London Pathological Society, 4 in the Philadelphia Society, 2 in the New York Society, and 2 additional cases referred to by Ashhurst¹³ in his Surgery, and not included in any of the above series. Hirschman¹⁴ of Detroit also reports a case. The above cases, with my own series of 8, make a total of 147 cases.

Except in isolated instances, no attempt was made to review the pathologic and surgical literature in German, French and Italian, as this seemed to little purpose. The collection of a more or less complete list of the reported cases would have been interesting, but not necessary to my purpose of deducing from the clinical notes, the symptoms and physical signs. The above series of cases was already sufficiently large and detailed both for that purpose, and also to give in a general way some idea of the frequency of these aneurisms.¹⁵

NECROSIS OF THE BONES OF THE FACE.*

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Pathologic changes about the tissues of the face resulting in death of bone are most common. It is quite usual for the dentist to remove portions of bone during the management of pyorrhea alveolaris and other suppurative conditions about the teeth. A cardinal symptom suggestive of beginning destruction of bone is swelling that pits on pressure, or what is known as edema. When this is found either on the alveolar process or tibia, a careful study of associated symptoms should be made, since it is on the proper and early management of such cases that the subsequent history depends.

When the existence of a periostitis is fully deter-

mined a free incision should be made down to the bone, for just so soon as the colony of bacteria that is causing the trouble is reached and disconcerted, their activity ceases and repair begins. When, however, myriads of bacteria are permitted to go on and multiply and destroy living cells, destruction is relatively great. The early treatment would appear to be applications of iodine and heat or ice, to be followed by incision in two or three days when no improvement is obtained from these remedies.

Syphilis as an etiologic factor should always be thought of, for in these cases radical operation should never be made, but instead, specific medication should be instituted.

To further emphasize the course of treatment and results in these conditions, a few typical cases are appended:

CASE 1.—H. H., male, aged 30, presented himself with a mouth converted into a pus basin. This putrescent condition had existed for many months. He had had a chancre four years before, but this history had apparently been overlooked, for specific medication had not been administered. An examination revealed a denuded left mandible from symphysis to condyle.

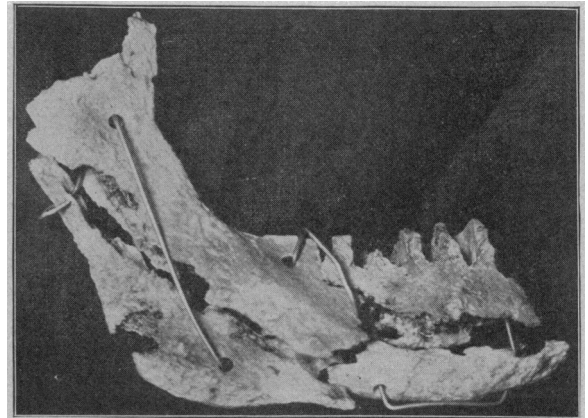


Fig. 1.—Outside of half of bone removed.

Operation.—There was nothing to be done but to operate. The first step required the removal of the entire left body. It was with some difficulty that the tissues were dissected back from the bone so as to permit its removal. Owing to the advanced process of decay the body was broken in three pieces. The angle and ramus were found also to be detached, but were included in the tissues, so that they could not be removed until a dissection was made from the position of the last molar upward, toward the coronoid process. This was done through the mouth with a pair of Cryer upper universal tooth forceps; the ramus was removed without great difficulty, the bone coming away in two fragments. It included the entire body, with the ramus coronoid process, sigmoid notch and the neck of the condyle, the condyle alone remaining on the left side. That portion of the symphysis not included in the specimen had disintegrated and was removed by curettement (Fig. 1).

Results.—Hemorrhage was extensive but this was controlled by packing, which was allowed to remain for forty-eight hours. Careful packing was required for several weeks, so as to keep the remaining half of the bone in as near a normal position as possible until reproduction of new bone has so far advanced as to bridge the chasm from the remaining condyle to the symphysis.

The ultimate result may be seen by studying Figure 2. Articulation between the teeth in the remaining half of the mandible and those in the corresponding maxilla is as near perfect as is possible. The wound itself repaired without incident under specific medication.

8. Trans. London Path. Soc., vol. xix, p. 93.
9. T. S. Holland: Dublin Quarterly Jour. Med. Sc., February and May, 1852.
10. Amer. Jour. Med. Science, January, 1881.
11. Rosenstern: Archives of klin. Chirurg., 1886, p. 49.
12. Winslow: Annals of Surgery, May, 1891; a series of 83 cases, 10 of which were included in Holland's.
13. Ashhurst: Surgery, sixth edition, 1893; 2 cases of interest.
14. Hirschman: Report of a case.—THE JOURNAL A. M. A., Aug. 16, 1902.
15. Other references which may be consulted are as follows: Wardrop: "Aneurism." Christ: "Diseases and Injuries of Blood Vessels." The inaugural dissertations of M. Kings, 1828; M. Poyers, No. 100, 1839; M. Beisteguis, No. 195, 1841; M. Lesage de La haye, No. 58, 1845. M. Velpeau: On aneurysm in Dictionnaire de Medicine, vol. xxviii, p. 466. Amer. Jour. Med. Science, July, 1847. 1856. Trans. New York Path. Soc., vol. i, p. 144, 155. M. Roberts: "Sur les Aneurysms de la region sus-claviculaire, 1842." M. Dubreuil: "Observations et Reflexions sur les Aneurysmes de la Portion Ascendante et de la Crosse de l'aorte, 1841." Rush: Thedretisch-praktisches Handbuch der chirurgie, vol. ii, 1857.
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