Thesis

The Pathology and Surgical Treatment of Aneurism

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Aneurism

Aneurism is meant a pulsating tumour composed of a cyst, the contents of which may be either fluid or coagulated blood. The cyst communicating with the artery upon which it is situated. John Hunter defined Aneurism as the dilatation of the coats of an artery, arising probably either from disease or accident, producing weakness which becomes the remote cause; while force of the circulation is the immediate cause; it probably also may arise however from a disposition in the blood action and then the disposition between the force of the circulation and the strength of the artery is both the remote and the immediate cause; but this probably only in the larger arteries where the force is greatest. Aneurism comprehends a variety of disease which have no common character except that they involve the arterial system. Aneurism properly so called comprehends the True and the False Aneurism. Although the True, the False, the Varicoæ, and Aneurismæ Barly receive the same general title differing very much.
however in their pathological character.
the True Aneurism is formed in several different ways, before treating of which I shall shortly describe the three tunics which form the coats of an artery. 1. The external coat. This coat is cellular or fibrocellular, it contains the nutrient vessels and nerves of the vessel; it is composed of a filamentous areolar tissue; some fine glistening fibres are seen in it. Some of which are circular and the rest longitudinal.

2. The middle or proper coat. This consists of yellowish, elastic but brittle fibres, these are arranged in a circular form; this coat is the most elastic of the three. This coat has been divided into three laminae; an external one which is thin and elastic, a middle one composed of circular fibres, and an internal one composed of fibres running in a longitudinal direction.

3. The internal coat. This coat has been subdivided into two laminae; the one is composed of tesselated epithelium, this rests on a basement membrane; the fibres of which are chiefly longitudinal; they interface with each other and leave
Numerous openings between them. These are what are usually called the surgical coats of an artery; but strictly speaking there are seven coats which are formed by the subdivision of the internal and middle. I have only described the three coats as they alone are mentioned. When speaking of the effects of rupture upon an artery, having described the coats of an artery I shall proceed to state how by circumstances affecting these coats an aneurism may be formed.

1st. True aneurism may be the result of dilatation of the coats of the artery. What it is produced by dilatation the coats do not rupture but simply dilate; all the three coats become so weak and inelastic that they yield to the impulse of the circulation of the blood, at the point where this takes place a pouch is formed. Which is termed the sac of the aneurism into this blood is forced at each contraction of the heart. This may be either fluid or coagulated. The dilatation may be on one side of the artery only, when it is saciform or the vessel may dilate and it is then fusiform or the dilatation...
may be uniform and it is then Cylindrical. Harpe maintained that the Aneurismal Sac was never formed by dilatation of the proper coats of the vessel but by the cellular sheath which the artery receives in common with the fascia contiguous with it and that there are none of those marks regarded by medical men as characteristic of Aneurism from dilatation which may not be met with in Aneurism from Rupture. The 2d way in which Aneurism may be formed is by dilatation along with Rupture of one or more of the coats; in this form dilatation first takes place of all the coats; then the internal either by ulceration or rupture gives way the middle coat expands or ruptures; and the Sac is formed by the external coat alone. This Sac gradually enlarges, within fibrin is deposited from the blood; and without the Sac condensation of the surrounding cellular tissue takes place; sometimes a Membrane is formed in the interior which is formed by organization of the fibrin; this Membrane is in most Cases
Continuous with the internal coat of the vessel. This process at the beginning is slow and gradual; but when the coats dilate and give way, it proceeds rapidly and in a short time acquires a considerable size. 2. An Aneurism may be formed by rupture of the internal and middle coats; this takes place most frequently during violent muscular exertion. An Aneurism formed in this way attains in a short time a large size. The patient often is aware of this from the first of its having taken place. The predisposing cause of Aneurism formed in this way is generally Atomaticous degeneration; it takes place in a system poisoned by Mercury and Syphilis. Scharf says that Aneurism is invariably produced by rupture of the inner coats of the vessel. There are different varieties of Aneurism. Dissecting. When blood is infiltrated between the coats of the artery and moves a gap separated, it is called dissected Aneurism. The external coat may be separated from the internal and middle, or the middle. The middle may appear split. The separation may be complete or it may be
Partial: the opening between the coats may terminate in a Cul-de-Sac, while the blood will stagnate. Or it may be complete, there being two apertures communicating with the artery through which the blood flows and joins the main stream. The coats of the artery in which this variety is most frequently seen: or the external or middle coats may give way and the inner one remain entire, which forms the walls of the cyst. This is however of very rare occurrence; the middle coat may rupture, leaving the external and internal coats entire. An Aneurism is said to be limited when it is covered and bound down by its proper cyst or diffuse when it has either no proper cyst or the cyst has ruptured. True Aneurism at first is always limited. In False Aneurism it may either be diffuse or limited from the beginning. False Aneurism by this term is meant an Aneurism in which the arterial coats have been divided by wound or ulceration, and consequently has none of the coats covering it; the cyst being composed of the tip of the aorta anterior to the
The variety of Aneurism is most frequently the result of wound; it is often met with at the bend of the arm as the result of wound inflicted in the artery during amputation. If this accident is discovered at once we may prevent the formation of the Aneurism by applying pressure on the part, and at the same time bandaging the arm from the fingers of the hand as far as to prevent it. The blood collects in cellular tissue beneath the fascia; the cellular tissue is condensed into the form of a cyst, that is strengthened by deposits of fat internally, and also from the tissues externally. The internal depositions being organized and constituting a lining membrane to the cyst the Aneurism may become diffuse by the cyst giving way or it may be diffuse from its commencement. The formation of False Aneurism takes place independently of any degeneration of the coats of the artery; and this is of great importance as we are unable to apply a negative close to the base, the coats there being as sound as in any other part of the artery. In regard to False Aneurism.
Karpf maintained that the division into true and false aneurism was erroneous and only the production of a false theory, "since" he says observation shows that there is only one form of this disease, or that caused by a rupture of the proper coats of the artery, and an effusion of tertian blood into the collateral sheath which surrounds the ruptured artery. There are two varieties of false aneurism. 1. Aneurismal variety. This variety of false aneurism is found when a vein and its artery have been injured, and when by the adhesion of the two edges of the wounded vessels a communication is established between the vessels; it generally occurs at the bend of the arm, but it has been met with in other situations; in consequence of this the blood flows directly from the artery into the vein. The size of the tumour is generally not great, but this will depend on the size of the communication between the vessels. The vein is dilated, and when the ear is applied to the tumour a peculiar jarring sound is heard, the blood in the tumour is entirely fluid, as it is kept in a state of
Constant Motion. The pulse at the wrist of the affected limb has been observed to be much smaller than that of the opposite limb. Dr. Hunter explains this by saying, if the blood can escape directly from the trunk of the artery into the trunk of the vein, it is natural to think that it will be driven along the smaller branches with less force and in less quantity. 2. Varicose Aneurism. This results also from wound both of the vein and artery, but on account of the oblique direction of the wound, or by the compression used; the blood escapes into the cellular tissue between the vessels where forms an aneurismal sac, through which the two vessels communicate. The tumour in this case is solid, this is a much more dangerous form of the disease than the former variety as the sac has a greater tendency to enlarge and burst. In considering any disease it is of great importance to know the cause which favours its production and the changes produced should be well understood. When an aneurism is formed a knowledge of
its exciting cause will aid us little, in our attempts to produce a cure; but in certain circumstances a knowledge of this will aid us much, in determining upon any means being employed and a possibility of cure resulting. In example, an aneurism arising from a wound or any injury to the coats of an artery, we have good grounds for supposing that the coats of the artery around the tumor are sound, in this case a chance of cure is much greater than if an aneurism is the result of disease affecting the coats of an artery, if two aneurisms exist at once, we have good grounds for supposing that the arterial system generally is affected, in cases such as this we must only employ palliative means and not expect anything like a cure. The investigation of the history of aneurism is very difficult. Experiments upon animals afford no assistance. John Hunter attempted to form an aneurism artificially in animals; for this purpose he laid bare the carotid artery of a dog, incised it, and next applied a wad of cotton, which was soaked in a hot spirituous solution of salt; such a wad of cotton deprived the artery of its natural supply of blood, causing, by the pressure of the cotton, a rupture of the wall, which gradually increased.
took place for three weeks the animal was killed and the aorta was found thickened at the point where the sheath had been taken off, due to the inflammation and subsequent condensation of the adjacent cellular tissue. These are some facts which are deserving of attention as they bear on the subject of Aneurism.

1. It is a disease which does not exist in early life; it has not been found before the age of puberty. It is a rather rare disease in old age, although it is sometimes met with. It is most frequently found between the age of 30 and 50.

2. Aneurism is often met with in males than in females, external aneurisms more particularly.

3. Particular parts of arteries as well as particular arteries also are more liable to it than others, the bend of an aneurism being generally the part where a branch is given off, or where a curve takes place in the vessel.

4. Aneurism was supposed to exist in the lower animals, but also
Late meeting of the Medical Chirurgical Society in this city, Dr. Dick showed that abdominal aneurisms were very common in the horse and cow, and that they were often connected with the worms turned the strongyle.

Aneurism is more frequently met with in persons of the lower ranks of life, who follow laborious avocations, particularly those who have to keep their limbs long in a bent position—as, petitioning those soldiers, sailors, etc. But it has been argued by some that particular trades do not predispose to the disease, but that a diseased condition of the artery led to the formation of the aneurism.

The aneurism may be produced by muscular exertion alone, as in the case of a man with the political aneurism who was in the infirmary here, under the care of Professor Miller. He distinctly stated that while using great exertion, he felt something "crack" in his leg, and in a few days he felt the tumour pulsating. An aneurism may also be l
Produced by a predisposing cause, in this case, it is not unreasonable to suppose that a diseased condition of the vessel first took place, and in consequence of the coats of the artery becoming weak and inelastic an aneurism resulted.

In an aneurism which has terminated acutely and in which we find an unhealthy condition of the artery, the following appearances are presented on sectioning up the vessel.

The vessel exhibits on its internal surface the lining membrane left smooth and polished than in its natural state; its colour is changed to a deep roseate Carmine, and it separates from the subjacent fibrous coat with comparative facility. This latter structure is also changed in colour but not to be bright red as the other.

Between these coats, but more closely attached to the internal, (for they peel off with it) are numerous sheets of a soft striated mate nature, of a white or pale grey appearance, presenting on a superficial
inspection somewhat of the Calcaneous deposit so often seen in the Arteries of the persons. An Artery in this Condition has lost more or less of its Elastic properties, it is distended and its Calibre increased equally around. As the Arteries are always full, the Impulse of every Pulse, Wave of Blood driven on, the greater quantity contained within the distended Vessel increases its apparent Pulsation, for it is in the diastole, or in the expanded Condition of the Artery that the pulse is felt.

This loss of Elasticity must obviously break the Vessel, and cause it to be less resisting, a fact that can be proved by experiment after death, when an Artery so circumstanced will be found to yield and tear under a distending force that would have little effect on it in health, and will explain how an apparently trifling exertion may produce Aneurism in one Man whilst numerous of others exposed to similar or greater Violence escape unharmed.

These appearances says Porter have been usually ascribed to inflammation.
but it is necessary to bear in mind that inflammation may present itself under two very different characters; both as to its pathological appearances and the results produced, thus we may call by the following designations: acute, and chronic, healthy and unhealthy. We can scarcely appreciate the early effects of inflammatory action in arteries, but judging from analogy it is not unreasonable to suppose that this species of the affection is ushered in by increased vascularity and edema, this is soon followed however by an effusion of congealing lymph on the internal mucous membrane; this will unite in a short time the two surfaces together so as to close the vessel at that point.

The unhealthy inflammation produces a very vascular state of the lining membrane, here and there, there are patches of deep red, in this state the coats being inelastic will yield and become distended under the impulse given by the circulation, hence we can
The Dissection of the Arteries may be produced by equal dilatation and form a fusiform
aneurism, in which as no portion of the blood is coagulated, it can scarcely be called an aneurism, after death a
coagulation is always found, a proof of a weak state of the coats, one part of the dilatation however may be weaker
than the rest, which will yield and a true aneurism be formed in which the blood will be coagulated.

An artery so inflamed is spotted over its surface with leucocytes and fibrin, and when the disease has gone on to far,
an aneurism is most likely to follow, but then a process to which the arterial system is not very liable takes place, the fibrillae
over one of these spots becomes soft, and soon an ulcer is formed. This may proceed...
The middle coat was so loose for that by the slightest shock the coats give way and an incarceration tumour is formed.

The following case described by Porter will explain the formation of incarceration in this way.

Edward Lynch, 26, a shoemaker of intemperate habits, was admitted into St. Thomas Hospital, March 19th, 1863.

Ten days previously he was seized with pain in the back, and stitches in the side and chest. More especially towards the lower part of the sternum in which latter situation he experienced a dragging sensation also. These symptoms continued without the intervention of any other during a week, when (on the 16th) he felt dizziness, more down in the chest on swallowing solid food, which increased to great difficulty of respiration on the following day. And since then, he has taken no solid whatever, the attempts to do so always producing great pain and a sense of weight, followed at first by hiccups and then vomiting. Being desired to swallow a morsel of bread, he did so, and said it
stopped in the passage. Often repeated
suffrages of mercy if pressed down, but not
without a good deal of pain, resembling
hiccups. It was not vomiting.

On examination, the child sounded
well on percussion, and the stethoscope
discovered no sign of the disease in the heart
or aorta. The motion of the heart was a little
stronger than natural, but the sounds were
healthy. Respiration feeble, but gases in the
upper part of the right lung.

This case was considered, and
acted as one of dysphagia, so much so,
that on the 21st day it proved a probing down
the esophagus. This did not meet only decided
obstruction, but was sensible to the instrument
seeking over a soft tumour. I recollect to
have mentioned to several of the pupils
the possibility of it being an aneurism,
and the awful consequences that must
result if the passage of the esophagus had
advanced to rupture it.

On the 25th in the evening, he
had an attack of cough and vomiting, in
which he threw up a great deal of blood.
Blood, and died immediately.

**Dissection**

The trachea, and oesophagus being cut across in the neck, the entire of the thoracic cavity, together with the stomach, were removed from the body; in doing which a tumour of the oesophagus was observed.

The stomach was distended, and of a dark colour; on opening it, a large coagulum of blood was found completely filling it.

On lifting up the oesophagus, a clot, much larger than a pigeon's egg, and covered only by the mucous membrane, was seen projecting into it. Its situation was nearly three inches from the cardiac end. The mucous membrane had given way in one spot, and the clot furnished the blood that filled the stomach, and which had been vomiting. The presence of this aneurismal lump had occasioned ulceration on the surface of the oesophagus opposed to it.

On opening the aorta, the pathology of aneurism, as connected with arteritis,
was beautifully illustrated. The lining membrane was of a bright crimson or Carmine colour, spotted with small specks like sketches of a gale, and more opaque in this vascularinity resided principally in the lining membrane; for, on stripping off a portion of it, the fibrinous tunic, although evidently inflamed, was much paler. The sketches above mentioned were caused by depôsitions of a soft white, cheesy substance, which were either in the lining membrane or between it and the fibrous coat; they came off attached to the lining membrane.

There were three aneurisms in different stages of formation. One, the largest, communicated with the clot, which had burst into the pharynx. The opening into the aorta would admit the point of the little finger. Another, within about half an inch of the former, was about the size of a hazel nut, its opening into the aorta being about the diameter of a Crow quill; its internal surface was smooth, and lined by the inner coat of the atypal; the middle coat terminated abruptly by a thick, collicular edge at the opening, and
its external covering seemed to be formed of the cellular coat together with the pleura. The third was only in its commencement; a slight elevation from the level of the lining membrane was seen in the centre of these opaque spots, under which the fibrous coat was thinned and beginning to be absorbed.

The larger tumour had made its escape through the costal pleuris, on the right bronchus, at its posterior part, and thus caused the stethoscope of inspiration observed during life in the right lung. The lungs were healthy; the heart healthy and softer than natural.

Sirica, Richerand, Corvisart, and others who have studied this subject carefully seem all to agree that intemperance and the abuse of Mercury are among the chief exciting causes of rhenuria.

Arteritis in connection with gangrene of the extremities is found mostly in those who are addicted to the use of spirituous liquors and stimulating food;
And in those who have suffered from chronic disease of the heart, of the mitral valves, or great vessels.

Another disease of the arteries which may lead to aneurism is the same degeneration which consists of a deposit of earthy matter between the internal and middle coats. As this degeneration is almost always found in old persons, while aneurism is rare in advanced years it cannot be supposed to be always a cause of aneurism; if however the deposit goes on to any extent, the vessel becomes more and more dilated on the cardiac side of this construction. A dilatation takes place, this may go on so as to form an aneurism or at this point the coats yield either by rupture or by degeneration, and aneurism is produced in the usual way.

From the period of its formation the cavity of the sac is always full, and at every fresh wave of blood it has a tendency to expand equally in every part of its circumference, by this expansion the elasticity of the surrounding parts is
brought into action, and a small portion of the blood is returned to the circulation, hence the pulsation found in a so called Aneurism at each pulsation of the artery a portion of blood is forced into the sac, in most cases this becomes coagulated, so that when examining an Aneurism we find the sac filled with Coagula, which are in concentric laminae; the Coagula are formed of lymph separated from the blood.

When the sac is full of fluid blood, the influx of each wave has a tendency to dilate it in every direction and therefore the greater the quantity of blood within the sac the greater will be the pulsation, but if the sac contains a large Coagulum, the pulsation may not be felt at all, or perhaps only very indistinctly.

Symptoms of True Aneurism

In Aneurism the first symptom is a small swelling which rises and comprehends, the consequence of the contents of the cyst being fluid. This gradually increases in size
and the interior of the Cyst is occupied by a Coagula, more or less hard; There is distinct pulsation from the first, this pulsation corresponds to the hearts action; it is equally felt in all parts of the tumour.

Pressure on the distal aspect increases it, while pressure on the cardiac aspect diminishes it; or may arrest it completely. By applying the ear to the tumour a peculiar thud is heard "Tuch de Soufflet" it conveys the impression as of a rush of air, took place into the sac at each pulsation. This "thud" is not however to be depended on.

As a symptom of aneurism, an artificial pressure on the tumour may produce it; as it may be produced by the pressure of another tumour near the aneurism, or in a fungoid tumour (which has also a pulsatile movement) the "thud" may be heard.

The growth of an aneurism is generally slow, unless it has been produced by rupture, in which case it increases with great rapidity. In consequence of the tumour pressing on the adjoining organs...
trucks named as Complaints of, which is
sometimes so great as to constitute in the
patient's eye the only part of the disease,
A numbness, and tingling sensation is
complained of in the hand, and sometimes
weakness and inability to use it.

Peters affirms that in every case
of papillary aneurysm, which came under his
notice, the fingers of the hand were crooked
and rigid; and in one case he remarked rigidity
of the wrist joints, and that in papillary
aneurysm if the tumour was large the
toes were contracted more in left; these
appearances he referred to the pressure on the
nerves, as they were relieved and disappeared
after operation.

The aneurismal tumours may
also be so situated in relation to the veins
as to interfere with the circulation of the
blood through them, the veins increased
in size and become flattened out, and
subsequently edema of the limb takes place;
after the operation and then for a short
time the contents of the cyst are hard and
form, the pressure may be increased.
and the supply of blood to the limb is dimin-
ished; that congestion is very likely to take place, the edema to increase and run on to gangrene. After the tumour has existed for sometime, its contents become solid, fibers are deposited in concentric lamellae; in consequence of the the fulduction of the tumour is affected, at some points it may be less distinct; in consequence of the form of the Coagula, its concomitance is also affected, for if the Coagula be hard and in considerable quantity while the communication between the Artery and Cyst be small, pressure will have little effect in diminishing the bulk of the tumour.

As the tumour increases, the parts around are also displaced, the function of some of these parts may be interfered with and change in their structure be produced. Some of the surrounding parts may become incorporated with the Cyst, absorption or liberation of these may be produced. When an aneurismal tumour presses upon a bone, the corresponding part of the Cyst is removed, and the bone forms
a part of it, being in contact with the blood, absorption of the bone takes place and the surface becomes rough and irregular. When cartilage is thus exposed to pressure, it suffers much less than bone, probably from being more deeply supplied with bloodlets. When an abscess becomes diffuse, the pulsation is diminished, blood is infiltrated into the surrounding tissues, in consequence of which gangrene of the limb may be thought on. In the circulation, may be only partially interrupted, the vitality of the part is much impaired and inflammation with suppuration take place, thus may run on to gangrene which may involve the whole limb.

Sometimes when an abscess becomes diffuse, a spontaneous cure is affected, but this is of very rare occurrence. Ancision is then fatal in different ways:

I. By preure on some important organ, abscess of the bladder, the urethra generally produces fatal by seeping on the treachea.
II When the Aneurism is bound down by fasciae, the patient generally dies soon after, but by irritative fever, pain and febrile.

III The most frequent form of fatal termination of Aneurism is by the bursting of the cyst, and fatal hemorrhage of blood ensuing; sometimes the sac burst at once, but more frequently as the blood is accumulating slowly, the blood oozes out. Sometimes in large quantities; perhaps a coil of blood may stop up the vessels; or a stroke occur and stop the bleeding for a short time, but the hemorrhage again comes on and the patient gradually sinks exhausted.

**Diagnosis of Aneurism**

As pulsation is the general characteristic of Aneurism, it should be attended to with attention, otherwise we may make an error in diagnosis and mistake an Aneurism for an enlarged gland or an abscess over the course of an artery.

An Aneurism is soft and compressible from its commencement, and then becomes hard from the fabric being deposited in its interior; while in Abscess it generally...
Hard from its commencement, the pulsation of an aneurism is felt equally in every part of the tumour, whereas in an enlarged gland or other tumour, pulsation is felt only at the apex; and if an aneurism exists, we can often stop the pulsation by drawing the tumour to one side. An aneurism situated over the course of an artery has an undulatory thud felt in the line of the beat and fading gradually away in more remote parts of the tumour. Some fungoid tumours have a slight pulsatile movement and if they are situated over the course of an artery, they may be mistaken for an aneurism. Aneurism has both thud and thud; another tumour may have one but not both, but this "thud" as before stated is not to be depended on, as other tumours may have a "thud" or it may be produced by arterial branches.

Prepare upon the cardiac side of an aneurism caused to collapse and the pulsation to stop, prepare on the distal side, produces an increased
Spontaneous Cure.

A Spontaneous Cure of Aneurysm sometimes takes place, this may occur in several different ways.

I. The sac of the Aneurysm may be strengthened, and filled up with Congenial lymph, that the blood may sink into it. While the original Canal remains firm and carries on the Circulation.

II. Pressure on the Cardiac side of the Aneurysm by another tumour may produce a Spontaneous Cure; or the Aneurysm itself may continue to produce this, by enlarging chiefly on its Cardiac side, and being bound down strongly by the fascia.

III. Both the sac and the Artery may be filled up by lymph, the Artery being obliterated at that part.

IV. The Aneurysm may become diffuse. The blood is infiltrated into the surrounding tissues and exerts pressure on the Cardiac side of the tumour, but a Spontaneous Cure in this way does not often
happen, as suppuration of the part or gangrene of the limb is very likely to follow.

Spontaneous Cures do sometimes occur in very hopeless Cases. Thus Roter mentions a Case of Aneurism at the Arch of the Aorta, which had produced Absorption of the Stomach and which threatened to burst momentarily, yet without any obvious cause the pulsation ceased. The tumour diminished in size and at last completely disappeared: the patient lived for many years after.

Surgical Treatment

Having Considered the Pathological and Symptoms of Aneurism, I shall now proceed to the Surgical Treatment.

Various have been the modes of treatment followed by Surgeons at different times. In the time of Celsus the tumour was opened by the knife, and a heated iron thrust into the wound to arrest the hemorrhage.

Actius in the 18th Century performed the operation for Aneurism.
at the bend of the arm, by propiaing the
vein and drawing it up with a blunt
hook, he then applied two ligatures and
divided the vessel midway between them.
The tumour was then laid open and the
Coagula turned out; the artery from
whence the blood flowed was then sought
for and when found it also was tied
and cut across. Anemurism at the bend
of the arm seem to be the only cases in
which he operated, as he says Anemurism
of the other parts of the body are considered
by Surgeons to be great remedy.

Paulus Regimena, a century after
recommended the following method,
when the tumour arose from a
related artery (as he supposed) a straight
incision was made through the vein, and
the artery having been cleared from the
surrounding parts a Needle was passed
under it and the artery tied with a double
ligature. Having previously punctured it
in the middle, suppuration was then
promoted until the ligatures fell off;
if the Anemurism was caused by suppura-

he ligated the tumour along with the skin and placed a needle armed with a double thread below the part that was to be included in the ligature. The aneurism was thus included between the two ligatures, down which he passed four ligatures below the tumour. The same practice was followed by surgeons for some time after, but as may be supposed it was not very successful, and we find that Levine and others preferred in most cases to open the sac by escharotics and the cautery.

And in 1710, was the first to introduce a new mode of treatment for false aneurism. He cut down upon the vessel and secured it by a ligature above the tumour without opening the sac. This treatment does not seem to have been adopted by the surgeons in those days, as in 1753, we find Forbest operating in the old way.

In 1785, John Hunter tied the femoral artery in the thigh for the cure of popliteal aneurism, but wished to propose this mode of cure from the
Unsuccessful results of the old method; the artery being tied in a Janet Littman.

The coats were those or the disease, and hence he tied the vessel with a ligature from the tumour, and where the coats were healthy. The force of the circulation being thus taken off the aneurysmal sac, the cause of the disease would in his opinion be removed, and he thought it highly probable that the sac if left to itself as well as the coagulated blood in it would be absorbed, and the whole of the tumour removed by the action of the animal economy, which would consequently leave any opening into the sac unnecessary.

Hunter in his first operation took four ligatures, but he afterwards the approved of using so many, as he found they could best come away without producing ulceration. And of course were exciting causes of secondary hemorrhage, it was owing to this that his first operation failed. After the obliteration of the trunk of the vessel the circulation of the heart is carried on by the collateral branches.
Which enlarge considerably and are connected by anastomoses.

Upon the different ways in which the collateral circulation is preserved, and partly also on the point of time at which the limb is examined after the obliteration of the principal trunk, may depend whether the collateral branches appear more or less, or even not at all enlarged.

The following is Sir Astley Cooper's account of the dissection of a limb, seven years after the femoral was tied for the cure of popliteal aneurism.

The femoral artery, which is necessarily obliterated by the ligature, was converted into a cord, from the origin of the artery profunda down to the knee. The whole of the popliteal artery was also changed into a similar substance, and thus the natural channel of the blood from the groin to the knee was destroyed. The muscles therefore which usually receive blood from the femoral artery, as the adductors, rectus, and vastus, had no branches
except from the Arteria profund and
Circumflex Artene, and the Articular
Arteries, from the Saphitalveal, although
they were still capable of receiving blood,
derived not from the Saphitalveal, but from
the Communicating Vessels of the profunda.
The Arteria profunda formed the new
Channel for the Blood, Considerably en-
larged in its diameter, although not
equal to the femoral artery at the groin.
It took its usual course to the back of the
thigh on the inner side of the thigh bone,
and sent branches of a larger size than
usual to the flexor muscles of the leg in
just midway on the back of the thigh. It
began to send off those arteries which
became the Support of the New Circu-
lation. The first Artery sent off aaped
anow close to the back of the thigh bone
and entered the two superior Articular
Branches of the Saphitalveal, which supply
the upper part of the knee joint.
The second new large Vessel arising
from the profunda at the same point
with the former slaped down by the
inner side of the biceps Brachii to an artery of the popliteal, which was distributed to the gastrocnemius muscle. Whilst a third artery dividing into several branches passed down with the sciatic nerve behind the knee joint, and some of its branches united themselves with the inferior articular arteries of the popliteal, with some recurrent branches of those arteries, with arteries passing to the gastrocnemius; and lastly with the origin of the anterior and posterior tibial arteries, and these new large communicating branches were readily distinguished from the others by these tortuous course. It appears then that it is those branches of the profunda which accompany the sciatic nerve, that are the principal supporters of the new circulations. They were five in number, besides the two deep seated arteries which do not accompany the nerves. The external cutaneous was considerably larger than usual for the supply of branches to the muscles on the fore part of the thigh;
but it had no branches for the deep circulation.

The Obturator artery did not appear larger
than usual, and although much pains were
taken to trace any enlarged communicating
branches between the obturator arteries
and the profunda, yet no vessels capable
of receiving so large an injection could be
found. When the ligation is applied, there
is a rush of the fluid of blood at the first,
the internal and middle coats are cut
through, and the ligation is held by the
external coat alone. Sometimes a clot
is formed above the ligation; but this
formation is of no consequence.

So the extensibility of the artery begins to
recover soon after the ligation is
applied, and the internal surface
adheres, and converts the blood into
an insensible canal, thus as before
described, the collateral branches begin
to enlarge, from the circulation in the
main trunk being suspended. After a
short time, circulation is produced by the
presence of the ligation: As long as the
ligature remains, this in small quantities
escapes, and finally the ligature itself escapes and the part granulates and fills up in the usual way. Dr. Jones has proved that a coagulum is chiefly formed when a considerable distance intervenes between the ligature and the first lateral branch, when the distance is short the ligature excites a sufficient degree of irritation to produce an effusion of lymph, but when it is considerable the part near the ligature is sufficiently excited, which is not the case with the more remote part. By the stagnation of the blood a coagulum is formed, which acting as a foreign body excites an action in that part of the vessel with which it is in contact, and produces an effusion of organized lymph, hence it would appear that all that is required for the obliteration of the vessel is a certain amount of irritation applied to a healthy artery. Sometimes the ligature fails to produce the desired effect, and in place of exciting a healthy action in the part it produces an unhealthy action. This effect will be noticed to when speaking of
Secondary Hemorrhage. As soon as the ligature is applied, the tumour becomes flaccid and ceases to pulsate; the limb becomes cold and weak, but does not remain long in this state. However, in a few hours its temperature is obtruded, sometimes its temperature rises 20 or 3 degrees above that of the opposite limb. After the operation the tumour ceases to be painful, its contents are gradually absorbed, but it is 24 months before it disappears altogether.

Sand's, in speaking of the cure of suppurating tumours, recommends us to use two waxed tapes of convenient breadth, placed behind and around the artery, near each other, with the interposition of a roll of linen of a cylindrical form, between the artery and the kind; his reasons for using two waxed tapes and the linen roll are the following:

The two waxed tapes which I propose to employ, placed contiguous to each other, each of which is two lines in breadth, rest upon a convenient space.
of, the Artery, on which account they
with difficulty produce its division, as the
ligature is only tightened on the Artery,
by the intervention of a Cylinder of linen
placed on the Artery lengthwise, and as
the transverse character of this Cylinder
projects a little beyond the sides of the
Artery, it therefore follows, that when the
Thread is conveniently tightened, the knot
of ligature formed by it is not, as com-
monly happens, a circular, strangling, or
squeezing of the proper Coats of the Artery
but perfectly, speaking an approximation
of the two opposite sides of the Artery
for the space of four lines, or of the
Artery in all that space were kept com-
pressed and held between the points of
the two fingers.

This in my opinion is the
best mode the Surgeon can take to prevent
the rupture of the Coats of a great Artery,
and to hinder their too rapid mortification;
to excite in them a due degree of adhesive
inflammation, to promote the union
and obliteration of the Cavity of the
artery, and thereby remove the danger of secondary haemorrhage. He also described the use of a ligature of linen and in this he was correct; but what difference is there between a roll of linen and a ligature? One is as painless as the other, for the linen roll used by Blasius is prejudicial in proportion to the degree of tension it excites. This practice however seems to have been very successful in his hands, the only explanation of which is, by supposing as Blasius does, that the roll of linen was chiefly applied to the insulating and dead part of the artery, between the ligatures.

Abrahamy advocated a modification of the practice of Banting, namely to apply two ligatures round the artery and the artery to be cut between them; but it has been proved by Dr. Jones that one ligature is as safe and as certain as two.

Both Hunter and Scarpa, as also the surgeons of that era, their contemporaries
been to have entertained the greatest dread of cutting the internal and middle coats of arteries; hence they used two or more tapes, applied loosely, and the principal object of Scarpa's using the lacerated lens to protect the vessels from being clogged by the ligatures. It is known that it is essential for the successful issue of the operation that the internal and middle cut, the ligature is to be drawn with tightness to afford to the fingers the sensation of giving way of the two internal coats, and it will be mentioned afterward, that when this rule is not attended to secondary hemorrhage is very liable to occur.

Sometimes the Cure may fail. This may depend on various circumstances. There may be some unnatural state of the blood, which prevents its coagulation, or the blood in the sac may be from some circumstance in a state of constant motion, which may hinder its coagulation; or peculiarly in the situation of the coagulum as mentioned.
by Porter may be the cause of failure.

Let it be supposed that the fluid has
coagulated, but by some unfortunate cir-
stances, the coagulum does not grip
upon the cephal, and then another con-
dition is enunciated. This cause of fail-
ure may arise from some particular
locality in which the disease occurs, it
is almost accidental and fortunately
as if rare occurrence.

II In want of support from
the surrounding tissues. This is often
the cause of failure in operations on
the upper part of the canthus.

Towards the pharynx, the artery has only
the mucous membrane, the constrictors
of the pharynx, colloidal tissue, and a
few twigs of the superior laryngeal nerve,
externally it has the stylopharyngeal, the
three stylopharyngeal muscles, the digastric,
the Mdloids, and fascia, hence during
the growth of the tumour, it extends toward
the internal aspect, while after the operation
it may fail to solidify and contract

There are two other modes of
treated Aneurism by ligature, namely
the mode proposed by Braden and Wardrop.

Braden's operation. This operation consists
in placing a ligature upon the distal
side of the tumour. It was proposed
but never performed by Braden,
Deschamps, and Dr. A. Cooper both
performed it but unsuccessfully.

It seems to have fallen into oblivion
until it was revived by Wardrop in 1822;
he considered that the changes which
such an operation produced both in
the artery and in the sac, are precisely
those which nature employs when
she cures the disease by a spontaneous
ligature. As regards the difference of
the state of the blood in an Aneurism
and in the sac, when the ligature is placed
on the cardiac, or on the distal side
of the tumour, he made the following
observations: When the ligature is
placed on the cardiac side, the
blood cannot make its escape and
cannot be pushed through the
Capillaries into the veins. It must remain in the lacs and must either be absorbed, or be evacuated by a process of inflammation and ulceration of the lac.

When the ligature is placed on the distal side of the tumour, there is immediately a diminution of the bulk of the tumour, the fluid blood can in such a case find a ready exit into the trunk from whence it came and thus again freights the circulation in place of as in the other case having to pass through the capillaries into veins, and as nature immediately finds a new channel there is in some blood impelled into them afterwards.

Now as regards his reasons against tying the ligature on the Codicidly it must be remembered that unless the disease is of long standing and of such a size that whatever practices be pursued the lac will burst. It is rare that the contents are absorbed; the greater quantity of blood is generally fluid, and
the said diminution of the tumour after
ligature on the distal side clearly proves
that the blood does make its way into
the veins without any "pushing," while
what has coagulated may, it has been
proved by Sir R. Cooper remains for
years without causing any inconvenience.

Then inflammation and
suppuration of the case are fortunately
of rare occurrence; his explanation of
the diminution of the tumour after
ligature on the distal side is quite
as difficult to understand. For how
can the blood find a ready exit into
the trunk from whence it came? and
it must be an extraordinary new channel
which indeed nature finds if this takes
place; or in other words, Wardrop would
have us believe that by application of
a ligature on the distal side of the
aneurism, a retrograde motion of the
blood in the cephalic vessel takes place.
The aneurismal bag and artery are
emptied of blood, no blood is kept in again;
and the artery and aneurismal sac are
obliterated by adhesion of their opposite sides, however although the explanation Wardrop has given of Bradsho's operation is faulty and must be explained in some other way, yet the operation may be performed when a ligature cannot be applied on the Carotid side of the Throat, thus if an Aneurism exist low down in the Carotid, Bradsho's operation may succeed as no lateral branches are given off and probably the Carotid is the only Artery in which it has any chance of success. Know any lateral branch the blood must be tied near the Throat where in all probability the external coats are thinned and hence ulceration and Haemorrhage are very likely to follow although Wardrop insists that the chance of Haemorrhage is much less in Bradsho than in Hunter's operation.

Of Aneurisms Cured by Bradsho's Operation Wardrop gives four Cases in which the operation was performed, two were successful and two unsuccessful.
Wardrop proposed a modification of Keen's operation, which was to apply a ligature on one of the branches only of an aneurysm, but not an aneurysm to the point immediately at its bifurcation; he was led to propose this operation from what Nature had done for the aneurysm of the innominate.

"The carotid artery was plugged up by and the large aneurysmal swelling was filled with clotting; leaving only a comparatively small channel for the blood to fall into the subclavian artery." Wardrop performed this operation once, and that with success, having tied the subclavian aneurysm of the innominate. This mode of operating has not been as far as Sam Houston followed by any other surgeon. The great objection to the operation is the great probability of a collateral circulation between the tumour and ligature, which would of course produce a great aggravation of the disease.

It has been proposed to employ galvanism in the case of aneurysm.
The manner in which this acts has been explained in two ways. When galvanism is applied to the blood removed from the body, the albumen is coagulated at the first issue, and it is supposed it acts in the same way when applied to blood in an abdominal tumor, as to the cause of the coagulation it appears to be due to the decomposition of the salt of the blood, and the action on the serum of the acids developed at the first issue.

In order that the coagulation of the blood takes place, it is necessary that the blood be retained in the sac, for sometime. Therefore compression is to be made above and below the sac during the operation.

The other mode in which galvanism may produce a cure is by exciting an inflammation in the sac and surrounding parts; this would be followed by swelling from effusion of lymph or serum, which would stop on the artery leading from the sac. The employment of electro surgery is attended with great risk. More especially if the tumor be of
Any size and situate on a large artery, and it is doubtful if a coagulum can be formed. However long continued, the current be applied, (a successful case of aneurism has been communicated in a late member of the Medical times) or the four cases have been published, in which it was tried in Dublin, and of these only one was successful, the other three having proved fatal. On the whole, therefore, as electro puncture can never be employed without great risk, we can never expect much from it in case of aneurism.

Words are proposed to inject caustic acid into the aneurismal sac, with the view of producing coagulation of its contents, but I am not aware that this proposal was ever carried into practice. Heat has been employed also to coagulate the blood in the sac. Sir E. Howe endeavoured to do this in a case of aneurism of the external iliac, which had been tied on the distal side of the tumour, but when the pulsation continued, he introduced a
Acupuncture Needle into the Centre of the Sae. The needle was heated by a spirit lamp, the integuments being guarded by means of a cloth. This operation was performed three times at different intervals; but in the end the limb was attacked by gangrene and the patient died forty-four days after. The last application of the heat compression of the artery above the tumour is often employed with success. Previous to the time of Hunter, when compression was used in the treatment of aneurism, the compress was applied to the aneurismatic tumour itself and the whole limb was supported with a bandage by the compress. On the face it was supposed that the blood was forced back into the vessels and at the same time prevented the further dilatation of the artery. It was also supposed that by the pressure the sides of the artery were brought into opposition and that adhesion took place between them. The practice was mostly confined to the cases of aneurism at the bend of the arm.
And only when the tumour was recent and of small size, but after Sten-Hunters operation; when aneurism became better understood, the prepa-
was applied between the tumour and the heart, but even then the mode in
which compression was supposed to produce a cure was erroneous for it was supposed that it acted in
the same way as a ligation. By ob-
literating the artery, the consequence
of which was that in the few cases
in which it was tried, it completely failed.

By the application of pressure
at the period mentioned surgeons endeav-
ored either to excite an inflammatory
process in the vessel at the point where
the preparation was applied; they supposed
that this obliterated the artery by the
adhesion of its opposite sides, or to
excite inflammation of the surrounding
parts and between the coats of the
vessel by which it would become ins-
nensitive to the further passage of the
blood. Acting on this supposition they
used such an amount of purgare as would act like a ligature and produce obliteration of the artery. It is now known that it is not essential that the circulation of the vessel leading to the aneurism should be checked altogether for a diminished current through an aneurismal sac will lead to the deposition of fibrin in its interior and cause it in a short time to be filled and obstructed in such a manner as no longer to permit the blood to pass through it. It is better that the blood should not be completely checked but the patient will bear the necessary amount of purgare required to produce a diminished flow of blood through the vessel better than he would to purgare applied here to stop the circulation altogether, and also by the amount of blood being lessened, the deposition of fibrin is increased in the sac, and it is well known that the treatment employed by Valdesova effected a cure in the same way.
It is argued by those who oppose compression that there are only a few arteries in which it can be employed. The following table from LeFanu shows that out of a hundred and seventy-nine cases, compression became most frequently in the very arteries upon which compression can be best applied:

<table>
<thead>
<tr>
<th>Artery</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posterior tibial</td>
<td>59</td>
</tr>
<tr>
<td>Femoral</td>
<td>14</td>
</tr>
<tr>
<td>Other parts</td>
<td>18</td>
</tr>
<tr>
<td>Carotid</td>
<td>14</td>
</tr>
<tr>
<td>Subclavian</td>
<td>14</td>
</tr>
<tr>
<td>Axillary</td>
<td>14</td>
</tr>
<tr>
<td>External iliac</td>
<td>10</td>
</tr>
<tr>
<td>Brachial</td>
<td>4</td>
</tr>
<tr>
<td>Common iliac</td>
<td>3</td>
</tr>
</tbody>
</table>

Total: 179

It has been argued that it is painful, excessive, and ineffectual; all these objections have been answered by Dr. Guirault in a paper which he read before the Surgical Society of Iceland.
And which is published in the tenth volume of the yearly abstract of the medical sciences, he proves that
the pain is owing to not attending to the
"amount minimus" prepare. Which the
patient can bear, he recommends Dr.
Cartes apparatus, being composed of
India rubber, has an elastic prepare
and does agree with the head, in yielding
force which a less apparatus produces.
As regards the objection to comprepression
being wearisome and prolonged, the states
that this is not borne out by facts, although
some cases may have been prolonged to
an unusual length of time. Granting
the days that twenty-nine days are
required for the cure, by comprepression
let us contrast this period with the
average duration of treatment by the
ligature and knife.

"From the time that a patient
with aneurism is admitted into the
hospital, until he is placed on the
operating table we may think safely
regard it as a week; from the application
of the leature until its dereration we may consider fifteen days, and for the closure of the wound, that May be taken seventy days. "More to a time when the whole full as great leature to occupied by leparation, I have taken the averige of all cases leature treated by leparation, and found it to be twenty nine days, here to do the same in every case. Where leature has been employed it would greatly exceed that time," he mentions two cases in one of which the fuluration had ceased ten hours after the application of the leature, and the other in which the fuluration of a large fumoral leureen ceased in thirty three hours, lastly as regards it being ineffectual, he states that for the last four years in Dublin both in Hospital and private practice, the leature has only been applied once and that for leureen at the bend of the arm. Where subsequently a high leperation was found to exist, the appearances observed in an history after compression had been applied.
For the cure of aneurism, we well observed in the case of a patient who had been cured by compression first of a popliteal aneurism of the right side and then of a femoral aneurism of the opposite limb, and who died several months after from aneurism of the arch of the aorta. I shall first give the report of both cures and then the appearances observed in the arteries of the patient, a servant aged 52, healthy admitted into St. Vincent Hospital under Mr. Bellingham—March 25, 1849. Labouring under popliteal aneurism of the right side, Simon noticed three months previously, patient's attention attracted to it by a feeling of weakness in the limb. No cause lassitude for it. The aneurism located high in the popliteal space, measures three inches transversely and a little more from above downwards, the lassus can be completely emptied by pressure upon the artery in the thigh, stiffness and weakness in the knee, with anachep.
Down the calf of the leg to the ankle. Complained of, there is some oedema about the ankle, and the veins of the leg are slightly varicoce. Compression commenced on April 3rd, the pressure applied upon the artery, as it passed over the margin of the tibia, discontinued on the following day, reapplied. April 6th, pulsation ceased on the following day, at which period the tumour is expected to have been about the size of a small orange, solid and hard. No bandage was applied to the limb, instrument removed. April 7th, the pulsation of the articular arteries about the knee was evident to the eye; and the general artery pulsated as low down as the tendon of the triceps. Patient discharged a month afterward, the tumour being then very small. He had a perfect use of the limb.

Duration of the prepare two days

Patient: A servant, healthy, aged 32. Admitted into St. Vincent Hospital under Dr. Wellington, June 26th, 1844, labouring under general oedema of the left side.
This Patient fifteen Months before had been the Subject of popliteal Aneurism of the Opposite limb which had been cured by Compression. About a Month ago he began to suffer from Pain in the Knee like Rheumatism. But the Tumour was only noticed ten days since as Cause assigned for it.

The Aneurism is seated in the lower third of the femoral artery engaging that part of the Vein which passes through the tendinous canal formed by the vastus internus and vastus muscles. Size from two to three inches from above downwards, and two inches transversely. Pulsatation very strong. The Patient complains of much pain which increases at Night. Compression commenced June 24th. The Prepuce applied to the lacerity so as it grapples over the Ramus of the pubis. Continued at intervals until August 3rd. In that the second instrument was applied. Pulsatation ceased. August 9th. Compression dis continued August 20th. At which date
the spongy tissue very firm and solid, and about the size and shape of a small hen egg. Patient discharged Sept 10th.

The limb reported to be as strong as the opposite. Duration of Compression 43 days.

This patient was again admitted for the 3rd time in December 1845, labouring under Aneurism of the Aorta and Aorta toward the end of the Month 12 years and a half after the Cure of the Posterior Aneurism, and 16 months after the Cure of the Femoral Aneurism.

Upon examination, at the site of each Aneurismal lobe, the artery was converted into a thick, flat, solid band, and its Channel was quite obliterated.

The femoral arteries in their Course down the thigh were perfectly sound and uninjured, and there was nothing to indicate the Points at which Compression had been applied. These reflections seemed to be rather smaller than usual, while the profunda and all the branches proceeding from
Il particularly the perforating and circumflex arteries were much enlarged. The branches which came off before the femoral artery divided were likewise increased in size. Below the site of the original aneurismal sac the carotid artery was contracted on both sides, and the anterior and posterior tibial arteries in each limb were diminished in diameter near their origin. From this it appears that the aneurismal sac, is the only part which is obliterated. When compression is applied at the point at which the vessel is compressed, not being obliterated, as is the case when the ligature is tied, the artery still continues to be the main channel for the convergence of the blood. The lateral branches being dilated only as much as to make use for the slight contraction which takes place in the vessel; whereas in Sir W. Cope's case which was described before, the whole femoral artery from the joint where the ligature had been applied to the knee was found...
Obliterated and the profunda was the branch which supplied its place.
The treatment of aneurism by compression may be tedious from a variety of causes, it may be so from the form of instrument used, from the manner in which it is applied, or from the situation of the vessel, or the state of the patient himself may cause the cure to be tedious, the state of his blood, his tolerance of pain, irritability of character, or the cure may be tedious owing to the situation of the aneurism, its size, or the period of which the compression commenced.
The treatment of aneurism by compression is obviously a much more certain mode than by the ligature, there is no injury done to arteries, and therefore no fear of secondary hemorrhage. The arterial supply is not cut off as it is by the ligature; so that gangrene cannot occur as the lacer is gradually filled up by fibrous tissue inside.
Of suppuration of the sac, which although in rare occurrences sometimes follows the application of the ligature.

Dr. Wellington gives in his work on compresion as a cure for aneurism. A list of 21 cases treated by it. Of these 20 were cured, one died from embolism, before the cure was completed, and in the remaining one the Hunterian operation was performed at the patient's own request.

There are some cases of aneurism in which the ordinary operation cannot be performed, and then it comes to be a very important question whether or not we can save the patient's life by a total performance of the Hunterian operation before the ligature. Some of the older surgeons adhered to the great danger which followed ligature of the vessel and opening of the sac, preferred to amputation as a safer mode of treatment.
Aneurismal tumours: Causes of the bone is produced, we would hesitate to tie the vessel, as it is obvious that it will be in a condition favorable to recovery, but as none of the great vessels are situated near bone except the posterior, this complication is all too often met with. When however it does occur it forms a sufficient reason for performing amputation.

II. When the diffuse form of tunnism is established, and when inflammation of the surrounding tissues has set in.

III. When there is obstruction.

To venous return owing to disease of the vein, in this case from the diminished quantity of blood back to the heart. After the vessel is closed, gurgling is noticeable to occur, and hence it will be a question of great importance, whether our patient will have a greater chance of recovery by letting up the syphol in the first place and running the risk of gangrene coming.
IV. When the Aneurism is of large size we would hesitate to apply ligature, the chief cause why this should be considered unfavourable is that the Sac runs a greater risk of suppuration.

Secondary Hemorrhage

After the application of a ligature for the cure of Aneurism it sometimes happens that at a period more or less remote what is termed secondary hemorrhage comes on. Practically we find with it under two different conditions, first where there has been previous bleeding, for example when a bleeding ulcer has been prone but after a time the bleeding again occurs; secondly where there has not been previous bleeding as when a ligature has been applied to an artery for the cure of Aneurism. I shall only dwell on secondary hemorrhage as it occurs in the treatment of Aneurism.

This may occur about this time when the ligature begins to come away.
It may also occur sometime after the
separation of the ligature; when it occurs
about the time of the separation of
the ligature - (between the 16th to 20th day)
it rarely ends favorably. In some cases
both the practitioner and patient receive
warning of what is about to happen by
the appearance of febrile symptoms &
full throbbing pulse, great heat of skin,
flushing of the countenance, headache,
restlessness, incontrollable anxiety, and a
peculiar sensation of tightness about the
cheek. But far more frequently the
haemorrhage comes on without any previous
warning, the slightest elevation on the part
of the patient producing it. A small quantity
of blood is lost at first from the bottom
of the wound, this may yield to pressure
or cease spontaneously; if it is still freely
excreted at first in each succeeding
haemorrhage the loss of blood is more
abundant. The patient then ejected
lies pale and cyanosed, yet at the
same time irritable and arterial, but
whilst under the influence of the febrile
Flanoy from his face is flushed, his skin hot, and dry, his pulse tight and bounding, but afflicting the sensation of a double beat, and it is during a period of such exacerbation that each successive hemorrhage occurs.

Secondary hemorrhage when it occurs early, maybe owing to sloughing or ulceration of the coats of the vessel. This may arise from injury done to the vessel, or from the vessel being too freely determinate from its consonance, and it may arise from the ligature being too loosely applied. An unhealthy inflammatory action is excited in the vessel, and an unhealthy action has no power to throw out lymph or the formation of adhesions. The term unhealthy is used because as inflammation tends to opposite centers in other structures, there can be no reason why it should not do so in the arteries. On one like healthy inflammatory action which tends to form coaguable lymph and the obliteration of the vessel.
action which has the opposite tendency.

By the application of a ligature, the internall and middle coats are divided and the ligature is only retained on the vessel by the cellular tissue, which is embraced by it. The tissue may have lost its vitality, and is separated by absorption of the surrounding sound parts, that leaves it with the rest of the tissue.

If an unhealthy inflammation has been established previous to this process as lymph is thrown out and there is an obstacle to the flow of blood, but if the healthy as before explained, lymph has been effused, adhesions have been formed there is an obstacle to the flow of blood.

Rözer reports that the inflammation which attacks the cardiac side of the ligature is different from that which attacks the arterial side. He proves this impression by the appearances which he finds in the journal anatomy before the liberation of the ligature in a patient who died the fifteenth day.
after the operation for the cure of hepitical

Sometimes the Haemorrhage

consecrating after the operation of the ligature.

This is almost sure to take place when the
wound remains long open, when abscess or

stomachous tissues form around the capell, which by
the pressure exercised on the latter produced

ulceration of its coats either above or below
the original seat of the ligature, in Cases
of this kind, if the situation allows, am-

putation is the only resource; but if this

pressure may be tried as a ligature may be

applied higher up, with little hope of success

Treatment of Secondary Haemorrhage

Many of the symptoms before

mentioned, the warning as of the approaching
danger are present, we may attempt to

defeat it by bleeding from the arm to as to

produce a sedative effect on the general

circulation. After bleeding an opiate

may be given, and we may keep up the

sedative effect by the exhibition ofaconite

or belladonna, but these means will

afford no safe guarantee against the
Occurrence of the Haemorrhage, in Most Cases the Practitioner has no Intimation of what is about to take place until the Haemorrhage begins; as the bleeding is generally of not always from the digital extremity of the artery, it will be advisable to avoid to apply a Ligature to the Cardiac extremity, as it is owing to the collateral circulation that the Haemorrhage takes place. The first thing therefore to be done is to enlarge the wound freely so as to expose the bleeding point. In this a Countertap will be accurately laid and then it firmly retained by a bandage or what is better by relay of Assistants who, believe each other at intervals, should they not succeed our only resource is to apply A Fresh Ligature on the Cardiac Side of the Back, this may arrest the bleeding but it may prove the Source of a Second Haemorrhage. The Haemorrhage from the second Ligature always appears than earlier period than the first. Little hopes of success are to be looked for in the Application of the Second Ligature, as if this and the Source of a Second Haemorrhage
it is very liable to induce gangrene of the hand. If haemorrhage take place in con-
squence of an abscess having formed, the matter is to be evacuated completely and a ligature placed (just above space) on the cardiac side, but if not we must trust to pressure applied accurately to the bleeding point; even should the haemorrhage be arrested, the patient is very liable to be affected by abscesses forming in the part periostitis, diseases of the neighbouring joint or gangrene of the hand.

Treatment of False Aneurism

This form of aneurism as before stated is most frequently met with at the bend of the arm as the result of wound. If the tumour has existed for a short time and if it is soft and compressible a direct incision is to be made into it. The coagula is to be cleaned out, and the aperture in the artery to be sought for and a ligature to be applied above and below the entrance. If however the tumour has existed for a length of time it is to be treated as a true aneurism by tying the humeral.
An interesting example of this disease occurred lately in the Hospital here in Professor Willan's wards. The woman had been admitted about three months before in consequence of an extensive wound at the bend of the elbow, a few days after her admission severe hemorrhage took place in consequence of which the wound had to be opened and the arteries were occluded. After this the wound healed well and she left the hospital cured; but about a month after her leaving the hospital she again presented herself with a fluctuating tumour occupying the front and the inside of her forearm, the cicatrix of the original wound being considerably elevated above the surrounding skin. A few days after, the tumour had evidently increased very much, and the skin was discoloured and attenuated, in consequence of which the ordinary operation for false tumour was immediately performed; great difficulty was experienced in finding the bleeding point, it was at length secured, and the woman has since lived well since the operation. This case
As regards the formation of the Aneurism it is very interesting. The woman when she left the hospital had not the slightest appearance of any thing of the kind, but she stated that a few days after she left the hospital she felt a pain and beating in the part and in a short time pulsation appeared. Now, it is very probable that an abscess had formed on the inside of the forearm this had gone on increasing until the pressure it ultimately had complicated the Cubital artery (as was found on opening the lacer). The opening in the artery was very small, which would account for the not suffering any of the bad results which follow the absorption of pus in large quantities into the blood.

Treatment of Aneurismal Varice

I Aneurismal Varice

This tumour is soft yielding and compressible. Pressure on the artery above and the vein below diminish its size, but is much increased by pressure on the vein above as before stated. Aedicula
Jarring sound is heard when the ear is applied to the part, but this sound is not peculiar to this disease; for it is heard in parts where upon inspection so much diseased existed. The disease does not generally cause pain in conveniently to the patient; it cannot be regarded as one demanding operation; we will only content ourselves by palliative measures, it will be sufficient to employ purgatives so as to prevent in some measures the growth of the tumours and the rupture of the arterial with the venous blood.

But we may meet with a case in which we are compelled to operate either by the urgency of the case or the patient's demanding by Radical Care, in this case we may either cut directly down on the tumours and treat it as a case of false aneurism, or treat it according to the Hippocratic operation, but I shall proceed to describe varicose aneurism and as the treatment for both is the same, I shall then point out which of the two operations we are recommended to perform.
II. Vascular Aneurism

In this form of the disease as before stated, there is a cyst between the Artery and Vein; thus differing from the former variety, if the aperture leading from the sac to the vein is of the same size as that from the Artery, the blood flows out as freely as it flows in. If the sac does not increase in size, but the aperture leading from the sac to be less than from the Artery in which case the tumour will increase in size and the blood will coagulate within the sac; such a case would demand an operation.

Suppose then, we were called to operate in any of the two forms of the disease. Which operation would we perform? Hunter's operation is only a palliative and often fails. Dupuytren has shown, on account of the numerous anastomosing branches which carry the blood round the seat of the tumour, it may seem to have some effect on the
ince a for a time, but as soon as the collateral circulation is fully established the tumour will be again the same size as it was before, in some cases however it may succeed.

The best treatment then if we must operate is to cut directly down on the tumour and tie the vessel above and below.

This is not however a very easy operation. In the first place the vein is much enlarged and lies directly above the artery, and we must be very careful not to injure the vein in any way. Then the haemorrhage in this operation is very great. More especially if the tumour has reached to any size, which although not too great as to endanger life yet of course the parts to a great degree, this haemorrhage is also difficult to arrest for the same pressure which will arrest the flow of blood from the artery, will increase that from the vein.
If the artery is reached it will generally be found either in an unhealthy or abnormal state, or so intimately connected to the vein as to be separated from it with difficulty, and it is now proved that this condition of the artery predisposes to a secondary hemorrhage.

Since then the Hunterian operation generally fails and the only radical cure is by a difficult and dangerous operation, it will be better for us to use palliative measures only, gentle compression, attention to diet, and avoiding everything which may excite the circulation.

Daldousie's Tait