ON THE

PULSATING TUMOURS OF BONE,

WITH THE

ACCOUNT OF A CASE IN WHICH A LIGATURE WAS PLACED
AROUND THE COMMON ILIAC ARTERY.

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THE recent occurrence of a case in St. Bartholomew's Hospital, of pulsating tumour originating in the walls of the pelvis in which a ligature was placed around the common iliac artery, has induced me to place before the Society, in connection with the narrative of this case, those circumstances in the history of the tumours of bone which bear on the important fact that certain of these tumours possess a pulsation identical in character with the pulsation of aneurism.

The pulsating tumours of bone differ from each other in their nature, they also remarkably differ in respect to the sources of their pulsation ; and it will be chiefly in reference to the latter point of their history, that they will, in the following paper, be considered. Three distinct sources of pulsation in these tumours can be recognized : 1. The proximity of a large arterial trunk. 2. The development of blood-vessels and blood-cells, constituting a sort of erectile tissue within the tumour. 3. Enlarge-

ment of the arteries of the bone in which the tumour has originated.

Of pulsation in the tumour of bone dependent on the proximity of a large arterial trunk.—This is the most frequent source of pulsation in these tumours, of which the following are examples. Many years ago, two females were admitted into St. Bartholomew's Hospital, one middle aged, the other considerably older, with pulsating tumours in the upper arm. In each case the tumour occupied the whole circumference of the arm in its upper two thirds, and in each, it possessed throughout an equal and strong pulsation, which ceased on compressing the subclavian artery above the clavicle. In each case, the disease was considered to be an aneurism of the axillary artery. In the case of the younger patient, the ligature of the subclavian was recommended, but not assented to; she left the hospital, and lived several years afterwards. The other patient remained in the hospital to the time of her death. In both cases, I had the opportunity of examining the limbs; in the younger patient the disease was found to be an encephaloid tumour originating in the humerus, and covered above by the articular cartilage of the head of the bone. In the view of discovering if any unusual development of vessels within the tumour had produced its pulsation, I injected water into the posterior circumflex artery which penetrated the tumour, but the fluid escaped only at a few points from the surface of the tumour, and there were no large vessels distributed through

it. In the other case, the tumour originated in the humerus, and was composed of a firm, apparently gelatinous substance, about half an inch thick, and forming the walls of a large cavity filled by a serous fluid. It is not improbable that this was originally a solid cartilaginous tumour, in which the central softening and breaking up of its substance had taken place, to which such tumours are liable. In this instance, previous to the examination of the tumour, I injected the brachial artery with wax, and observed no remarkable distribution of vessels through the tumour: the injection passed very freely from the arteries into the veins of the limb. To this circumstance I am not disposed to attribute the pulsation of the tumour, as it is not unfrequently noticed in successful injections even of coarse wax into the arteries of the limbs, quite independently of disease. In both these cases the brachial artery was perfectly healthy, and, with its accompanying veins and nerves, was found closely united by cellular tissue to the tumour through its whole extent.

Subsequently to the foregoing cases, the following occurred in St. Bartholomew's Hospital. A man aged 30 was admitted under the care of Mr. Lawrence, with a swollen and painful state of the right knee-joint, consequent on a fall; for the removal of which, antiphlogistic treatment was successfully employed: but shortly afterwards, a painful swelling arose immediately above the knee, and gradually extended around the back part and sides of the lower third of the thigh. Near the tendon of the biceps,

a softening of the swelling indicated the probability of its containing matter, and accordingly a small incision was here made into it, from which about four ounces of arterial blood freely flowed. On examining the swelling more closely, pulsation in it was now discovered, and at the same time it was observed that the leg had become œdematous, and that the toes were colder than in the opposite limb. In consultation it was agreed that sufficient ground existed for believing the tumour to be a popliteal aneurism, and accordingly the femoral artery was tied in the middle of the thigh. The pulsation of the tumour immediately ceased, and its size gradually diminished; but after some time it again enlarged, became painful, and the skin covering it sloughed; the sloughing extended deeply into the tumour, but was unaccompanied by hæmorrhage. Whilst these changes were in progress, the man left the hospital, and shortly afterwards he sunk from exhaustion. I obtained permission to examine the limb, and found the tumour to consist of a compound of soft fibrous and dense osseous tissue, the latter situated deeply and extending around the femur, in which it appeared to have originated. The whole series of femoral, inguinal and lumbar absorbent glands were converted into osseous tumours. The femoral and popliteal vessels were sound. In the lower part of the thigh, the femoral artery was a little compressed and displaced by the ossified absorbent glands, which were closely united to it.

The specimens of disease from the three foregoing

cases are preserved in the Museum of St. Bartholomew's Hospital.

To the cases which have been related, I add three other examples of the same class of pulsating tumours, two of which were communicated to me by Mr. Hodgson of Birmingham, and the third by Mr. Lawrence. In Mr. Hodgson's cases, the disease was situated in the leg, and had originated in the lower half of the tibia, just above the inner ankle. In both cases the tumours were encephaloid in their structure ; and in a communication recently received from Mr. Hodgson, he observes, " to what these tumours owed their pulsation I know not, but I thought it was derived from contiguous arteries." Mr. Lawrence's case is already recorded in the 17th volume of the Transactions of this Society: it was an instance of medullary tumour developed in the head of the tibia, attended at one period with pulsation and suppression of the pulse in the anterior and posterior tibial arteries at the ankle. In the account of the examination of the limb, Mr. Lawrence states that " the medullary tumour had protruded from the bone just at the division of the popliteal artery and the passage of the anterior tibial, through the inter-osseous ligament ;" and he observes that " this circumstance accounts for the pulsation felt in the tumour at an early period ; for the suppression of the pulse in the tibial arteries when the morbid growth was confined by the fascia of the leg ; and for its subsequent return when the progress of the swelling through the fascia had liberated the arteries from pressure."

Here are six examples of pulsating tumours differing in their nature, and originating in different bones, but agreeing in the circumstance that no other source of pulsation was discoverable in them, than the contiguity of large arterial trunks ; and to the same class of cases, the important one recorded by Mr. Guthrie appears to belong, in which a tumour about as large as an adult head, situated upon the right nates of a female, presented so decidedly the characters of aneurism, that it was believed to be so by Sir Astley Cooper, and other experienced surgeons who were consulted upon the case, and, accordingly, a ligature was placed around the common iliac artery. The following is an extract from a Clinical Lecture delivered by Mr. Guthrie on this case :—" I examined the tumour very carefully, and for some time I was very inclined to doubt whether it was a malignant tumour or an aneurism I had to treat ; however, I at last came to the conclusion that it was the latter, firmly bound down by the glutæus maximus, which gave it considerable consistence, and rendered the pulsation less distinct, although it was decidedly manifest in every part ; and on putting the ear to it, the whizzing sound attendant on the flowing of blood into an aneurism could be very distinctly heard ; it was very audible previous to an operation being performed. The ligature of the common iliac artery was followed by a diminution of the tumour to the extent of one half, and the recovery from the operation was complete. Five months afterwards, the tumour again enlarged,

and she gradually sunk. On examination, the tumour was found to be composed of cerebriform substance. The arteries were healthy.”*

Of pulsation in the tumour of bone, dependent on the development of blood-vessels and blood-cells constituting a sort of erectile tissue within it.—In the case of recent occurrence in St. Bartholomew’s Hospital, the pulsating tumour originated in the ilium: it was soft, spongy and dark coloured, with cells dispersed through it, each about the size of a pea, and filled with blood. Bunches of convoluted vessels were drawn out of this spongy substance; and, when macerated, this substance was reduced to a tissue, closely resembling that of unravelled spleen or placenta. Here was a structure capable of enlargement by the distension of its vessels and cells; and assuming these to have been directly continuous with the arterial system, it may be added that the rush of blood into such a structure would give to the whole mass a pulsation resembling that of aneurism; at all events it is certain that this tumour did possess such a pulsation, which ceased directly the aorta was compressed through the abdominal parietes: moreover, that the tumour enlarged and became tense when the femoral artery below it was compressed, as an aneurism under similar circumstances would have done. I am indebted to Mr. John Lawrence, jun., Surgeon to the Sussex County Hospital, for the following case of pulsating

* London Medical and Surgical Journal. August 1834.

tumour, originating in the femur. A man aged 49, was admitted into the hospital with a small swelling in the right groin, under the femoral artery : it gradually increased to the size of an egg, and was then observed to pulsate, after which it rapidly increased. The pulsation continued, was uniform over the whole tumour, and accompanied by a distinct bruit. The limb became œdematous, and he gradually sunk with symptoms of disease in the lungs. The femoral artery was injected with size and vermilion. The tumour was found to have originated in the upper part of the femur : its immediate investments were some remains of the periosteum, with the surrounding muscles ; interiorly it consisted of vessels intermixed with a soft gelatinous substance. The vessels formed more than half the tumour, were about the size of sewing thread, and very convoluted ; that these vessels were directly continuous with the arterial system, was shown by the readiness with which they were filled by the coloured size injected into the femoral artery, and it may be inferred that the distension of these vessels with blood would be sufficient to occasion pulsation in the tumour.

Of pulsation in the tumour of bone dependent on the enlargement of the arteries of the osseous tissue.—Of this form of pulsating tumour, a few examples have been recorded. In one of these, related by Dupuytren, the disease originated in the tibia ; and in the examination of the limb, the arteries ramifying around and penetrating the bone were found

much enlarged, and the veins of the limb were similarly altered.*

There are also cases recorded by Pelletan, in which the pulsating tumour appeared to have originated in the enlargement and rupture of the special nutrient artery of the medullary tissue;† and there is a case recorded by Morgagni, in which the foramen in the walls of the femur, transmitting this artery, had enlarged to the degree, that it easily admitted the little finger.‡ Mr. Luke, of the London Hospital, has furnished me with the following case, which apparently belongs to this class of pulsating tumours. A man, aged 20, suffered a fracture of the femur, which, at the end of seven weeks, was firmly united. A month afterwards, by a second accident, the bone was again broken at the same part. Re-union of the fracture ensued, but very slowly and unevenly. A tumour now formed in the situation of the injury: it was hard in some parts, soft and elastic in others. A grooved needle was introduced into it, and a jet of blood followed. The tumour increased to the size of a large melon, became very painful, and pulsation in it was now discovered. Suspicion of its being an aneurism in consequence arose, and in consultation it was determined to tie the femoral artery; this was done with the effect of stopping the pulsation of the tu-

* *Leçons Orales*, t. iv., p. 60.

† *Clinique Chirurgicale*, t. ii.

‡ *On Diseases*, Book IV. Letter II., art. 38, 39.

mour, and producing a diminution of it, to the extent of an inch in its circumference. About a month afterwards, the tumour again enlarged, but without the return of pulsation, and it was now deemed right to amputate the limb. The surface of the stump bled so profusely, that more than forty arteries required the ligature. The medullary artery was greatly enlarged, and threw out a forcible jet of blood. The man left the hospital with the stump healed, and in every respect well. On examining the limb, the lower third of the femur was found expanded into a spherical tumour, in the interior of which were cells of varying size, some of the largest about an inch in diameter, and they were filled with blood. The femoral and popliteal artery and vein were entire and healthy. From the diminution of the tumour, which immediately ensued upon the ligature of the femoral artery, it may be inferred that the arterial ramifications opened directly into the cells, of which the tumour was principally composed, and that in this manner the distension of the cells and pulsation of the tumour were produced ; it may however be a question whether the general enlargement of the arteries of the thigh had accompanied the formation of the pulsating tumour, or had taken place subsequently, as a consequence of the current of blood through the femoral artery being obstructed by the ligature.

There is one circumstance in the history of these pulsating tumours which requires especial notice, as it appears to have a material influence on the

production of pulsation in them : this is the density and resistance of the structures which immediately invest them. In the instances of the development of the tumour within a bone, a thin osseous shell with thickened periosteum is its first and immediate investment ; and in the instances of the development of the tumour upon the outer surface of a bone, thickened periosteum alone will be its first investment : moreover, according to the situation which the tumour happens to occupy, it will be more or less closely confined by the muscles immediately around it, which may then add considerably to the density and resistance of its coverings. Such were the circumstances of the case, recently in St. Bartholomew's Hospital, wherein the pulsating tumour, growing from both surfaces of the ilium, was in great part covered by the periosteum, much thickened, and it was, besides, closely confined by the iliacus internus muscle stretched over it on one side, and by the glutæus medius on the other. It may indeed be doubted whether any of these tumours would pulsate without the resistance derived in one or other direction from the bone or its coverings ; and accordingly, in the case recorded by Mr. Lawrence, the medullary tumour developed in the head of the tibia pulsated in its early stage, but ceased to pulsate directly it had burst through the resistant coverings of the bone. A tumour originating in soft parts, unconnected with any bone, but situated close to a large artery, and confined within resisting structures, and thus approxi-

inating in its conditions to the pulsating tumour of bone, may, like it, pulsate in a manner to be mistaken for aneurism, of which the following is an instance.

A middle-aged man was admitted into St. Bartholomew's Hospital under the care of Mr. Earle, with a pulsating tumour, about the size of a small orange, situated immediately below the left clavicle, which presented all the characters of aneurism, and accordingly a ligature was placed around the sub-clavian artery upon the first rib. This was followed by an immediate cessation of pulsation in the tumour, and by a gradual diminution of it. The ligature separated at the usual period, and during the further progress of the case, no circumstance occurred to induce a suspicion of the disease being otherwise than aneurism; and, on the man's leaving the hospital, the tumour had diminished sufficiently to confirm this opinion of its nature. Six years afterwards, he was again admitted with general derangement of the health, from which he sunk. I injected the arteries of the upper half of the body with coarse wax, and found that the collateral circulation had been carried on chiefly by the inosculation of the supra and infra scapular arteries, which were greatly enlarged. From the first rib, the axillary artery, to the extent of about an inch and a half, was contracted and plugged by firmly adherent fibrin, but the coats of the artery were entire and healthy, and they presented no indication of having been the seat of aneurism. Immediately behind the

artery was a solid tumour of oblong form, about three inches in length and two inches in breadth. This tumour was moderately firm; internally it presented no other well-defined character than that there were cells dispersed through it, filled by a peculiar morbid deposit. A nerve, presumed to be the median, was closely connected with the tumour, and some of its filaments were expanded around the tumour in a manner to indicate it had originated within the sheath of the nerve. From this examination of the parts it appeared impossible to conclude otherwise than that there had been no aneurism, and that the tumour, originating within the sheath of the nerve, and closely embraced by the other nerves of the axillary plexus, had derived its pulsations from the axillary artery, close to which it was situated. This tumour is preserved in the Museum of St. Bartholomew's Hospital.

It is certain that there have been instances of the tumour of bone, the pulsations of which were, in every particular, identical with those of aneurism. In the case of pulsating tumour of the ilium, which will presently be related, the ear, resting against the walls of the abdomen, recognized in the tumour the strongly-marked bellows-sound of aneurism. So, likewise, in the case of encephaloid tumour of the pelvis recorded by Mr. Guthrie, it is stated "that on putting the ear to the tumour, the whizzing sound attendant on the flow of blood into an aneurism could be very distinctly heard." In the

instances of the development of blood-vessels and blood-cells in the tumour of bone, its pulsation, and the accompanying bellows-sound, may be caused by the rush of blood through these vessels and cells just as they result from the flow of blood through the sac of an aneurism. But in the instances where there was no other discoverable source of pulsation in the tumour of bone than the large artery situated close to it, yet the bellows-sound in the tumour was strongly marked, and could then be ascribed only to a change in the character of the pulsations of the artery dependent on the presence of the tumour. For true it is, as Dr. George Burrows remarked when engaged with me in the consideration of the case recently in the hospital, that in states of general anemia, also in diseases of the aortic valves allowing of regurgitation, limited portions, or even the whole, of the arterial system, without organic change in the vessels, may impart to the stethoscope a murmur approximating to the bellows-sound of aneurism. And if, under such circumstances, a tumour should happen to form in any region of the body so close to a large artery as to influence its pulsations, then, by the stethoscope, the bruit or bellows-sound may be recognized in the artery as forcibly as in an aneurism. Precisely this concurrence of circumstances happened in the case which will presently be related. The man had a tumour on the inside of his arm, in part covered by the biceps muscle, therefore directly over the brachial artery ; and by the stethoscope, or by the ear alone,

the loudest bruit was recognized in the artery immediately above and below the tumour. These considerations show the little value to be attached to the existence of a bellows-sound in the diagnosis between aneurism and the pulsating tumour of bone.

I now proceed to relate the case of pulsating tumour of the ilium of recent occurrence in St. Bartholomew's Hospital, wherein a ligature was placed around the common iliac artery.

On Saturday the 18th of January, the patient was sent to the hospital by Mr. William Pennington. His age was 42, stature tall, and rather thin. During the last four years he had suffered at times from pain in the left hip-joint and back part of the pelvis, which was supposed to be from rheumatism and sciatica. His habits of life had been temperate; during the last twenty years he had been a butler in a gentleman's family, in the duties of which station he had continued to the day of his admission into the hospital. His complexion was sallow, appetite good, tongue clean, bowels regular, urine healthy, and nervous system tranquil. His pulse varied from 96 to 100. The sensation communicated to the finger placed upon any of the larger arteries was that of the vessel being præternaturally large, and of its beats being accompanied by a powerful vibration; through the stethoscope, placed on the brachial, or femoral artery, a distinct murmur or bruit was communicated to the ear. The pulsations of the left ventricle of the heart were loud, but not accompanied by bruit. By percussion, a

dullness of sound was recognized in the upper and front part of the right side of the chest.

On the inner side of the right upper arm, at about its middle, a tumour was discovered, about the size of a small orange, of an oblong form, and very loosely connected with the surrounding textures ; its surface was smooth, it was wholly free from pain, and there was no pulsation in it. The man stated that he had first observed this tumour about ten years ago, and that during the last three years it had not increased.

The pulsating tumour was situated on the left side of the pelvis, its chief connection being with the ilium, in about the anterior half of its extent ; it projected from both surfaces of the ilium, but more considerably from its abdominal surface, and it extended upwards to the crista. From the abdominal surface of the ilium the tumour extended downwards to Poupart's ligament, along its outer half, and into the cavity of the abdomen towards the mesian line. The tumour felt every where moderately firm, and when compressed it did not distinctly recede. The portion of the crista of the ilium which bounded the tumour superiorly, was uneven and thickened, and a little below the crista, near the anterior superior spine, a small moveable piece of bone was discovered, apparently involved in the tumour. Every where within reach of the fingers the tumour pulsated, not with a thrill or vibration, but with the deep heavy beat of aneurism. In the portion of the tumour projecting

from the dorsum of the ilium, the pulsation was less forcible than elsewhere. By the ear resting against the abdominal parietes, a bellows-sound in the tumour was plainly recognized. The external iliac artery could be traced by its pulsations for some way along the inner side of the tumour. Compression of the lower part of the aorta stopped the pulsation of the tumour. Compression of the femoral artery, below the tumour, produced an immediate enlargement and increased tension of it. A small artery was felt pulsating upon the lower and outer part of the tumour, its pulsations were vibratory, as in the rest of the arterial system, and were distinct from the deep, heavy pulsation of the tumour. The skin covering the outer part of the tumour presented a slight blush, and the man stated that the tumour was at the present time slowly increasing.

Such were the local features and the accompanying constitutional phenomena of the disease, respecting the nature and treatment of which we had to decide. In this decision, the following points were involved :—was this pulsating tumour an aneurism, and, if so, from what artery had it arisen ; or was it one of the pulsating tumours of bone which have been shown in this paper to be not of very rare occurrence ? In favour of its being an aneurism were the characters of its pulsation, with the accompanying bellows-sound, and its proximity to more than one artery sufficiently large to give rise to an aneurismal tumour of this mag-

nitude. Against its being an aneurism were the unevenness and thickening of the crista of the ilium forming the upper boundary of the tumour, also the existence of the moveable piece of bone just below the crista, and apparently involved in the tumour, inasmuch as both these circumstances belong to the ordinary progress and characters of tumours originating in bone rather than of aneurism.

Moreover, the situation of the tumour furnished an argument against its being an aneurism ; for it might be urged that an aneurism, arising either from the external or internal iliac artery, would be more likely to extend in the direction of the abdominal cavity, than through the bones and thick muscles forming the walls of the pelvis. Much stress could not, however, be laid on this consideration, since an aneurism arising from the side of the external or internal iliac artery, which is in contact with the walls of the pelvis, might extend into the bone, just as an aneurism arising from the side of the thoracic, or abdominal portion of the aorta, in contact with the spine, does in some instances cause the absorption of the bodies of the vertebræ. Nor is it to be supposed that the tumour in the arm was out of our view ; but its characters were so decidedly those of an innocent structure, that it appeared to have not the least bearing on the question of the nature of the pulsating tumour of the pelvis. In consultation, the preponderance of opinion was in favour of this

tumour being an aneurism, and the treatment was accordingly to be considered.

In the uncertainty respecting the origin of the supposed aneurism from the external or internal iliac artery, the decision would obviously be, that the common iliac should be tied. But from a careful consideration of the circumstances of the man's general condition, we agreed that so serious an operation could not be recommended, that its performance would be justifiable only under the circumstances of the patient being made thoroughly aware of his condition, and of his then desiring to take the chance of prolonging life which the operation afforded. His feeling was so decidedly expressed in favour of submitting to the operation, that I considered it my duty to undertake it.

I omit the details of the operation, with one exception. After the ligature of the iliac artery, the pulsation of the tumour completely stopped, when accidentally placing my fingers on its upper surface within the abdomen, I here felt an artery about the size of a crow-quill, pulsating forcibly, and with the vibratory character of the pulsations in the rest of the arterial system. At this discovery I was startled, for with full confidence in the power of the anastomosing circulation, I was not prepared to find, the instant after the ligature of the common iliac artery, that the blood was traversing the circumflex artery of the ilium with the same freedom and force as before the operation ; the circumstance made me

apprehensive that the disease was something more than ordinary aneurism.

The operation was performed on Monday the 27th of January. Immediately after it, the patient took forty drops of laudanum in an ounce of camphor mixture. On visiting him in the evening, I found that he had been wholly free from uneasiness, and, to my surprise, that his pulse, which before the operation had varied from 95 to 100, was now only 80, and besides that, it was full and soft. This was satisfactory, as it permitted the hope that the character of the pulsations in the heart and arteries, noted before the operation, had for its cause excitement of the nervous system, and not, as had been apprehended, disease in the vessels. On the following morning, the pulse was accelerated, but no other change had occurred worthy of remark. Without any unfavourable symptom, the case proceeded to the middle of the second day, when the stomach became irritable, and the pulse extremely frequent and feeble, the abdomen swelled and became tender, there was almost constant vomiting, and with these symptoms he sunk, on the morning of the third day from the operation. With respect to the condition of the limb, I have simply to state, that no ill effect was produced upon it by the stoppage of the direct supply of its blood. At first the man stated that his foot was cold, and the rest of the limb numbed, and the sensibility of the skin of the leg was so far impaired, that slight friction of it was not felt. A bottle of warm water was kept in contact with the

foot, and the limb was enveloped in flannel. The numbness and coldness gradually diminished, and during the last twenty-four hours of his life, the man stated that the limb felt in no respect different from the other.

On examining the body, the effects of peritonitis were observed, but chiefly in the deeper parts and left side of the abdomen; here there was increased vascularity of the peritoneum, with the deposit of lymph on its free surface. Through the cellular tissue of the left lumbar and iliac regions, which was the tract of the wound, suppuration had taken place. The left common iliac artery was found to be only an inch and a half in length, and the ligature was placed around it exactly an inch below the bifurcation of the aorta. A loose conical clot was found within the artery, between the ligature and the aorta; and on detaching the ligature, the inner and middle coats of the artery were found completely divided. In the wall of the left ventricle of the heart, near its apex, there was a medullary tumour, about the size of a filbert. The free margins of the aortic and mitral valves were slightly thickened, and there were a few slight deposits of fatty matter in various parts of the aorta. Through the bronchial glands, medullary substance was diffused; and there were small deposits of the same kind in the lungs. Some slight remains of old tubercle were found in the upper part of the right lung.

On examining the tumour of the pelvis, it was

found that the portion of it projecting into the abdomen had displaced the external iliac artery from the walls of the pelvis, but that this artery had no other connection with the tumour than by loose cellular tissue. The internal iliac artery and its branches were in their natural situation, and wholly unconnected with the tumour. The abdominal surface of the tumour was covered by the iliacus internus muscle, and the portion of it projecting from the dorsum of the ilium was covered by the glutæus medius. Beneath these muscles, the periosteum of the ilium, much thickened, was extended over the tumour, excepting in its central and most prominent part, where the periosteum having been absorbed, the substance of the tumour was in contact with the contiguous muscles. I infer that the morbid growth originated in the periosteum and not in the bone, from the circumstance that it was intimately united to the periosteum, whilst it had no such adhesion to the bone, and from the appearance of the surface of the bone beneath the morbid growth, in which there were a multitude of minute holes, presenting the character of disease extending into bone rather than arising from it. It has been already stated that the substance of the tumour was composed of a spongy tissue with cells and convoluted vessels distributed through it. Through the two anterior thirds of the tumour the ilium was found unaltered, excepting the existence of the minute foramina in its surface, already noticed, but through its remaining third the integrity of the bone was destroyed, it had separated

into loose fragile fragments ; consequently in this situation a direct communication existed between the two portions of the tumour on the opposite sides of the ilium.

I removed for examination the tumour from the inside of the arm ; its connection with the surrounding textures was by loose cellular tissue, through which a congeries of large convoluted veins was distributed. A section being made of the tumour, its internal structure was, to our surprise, found to be identical with that of the tumour of the pelvis. It must be recollected that the tumour in the arm had never been painful, that its formation commenced ten years ago, and that during the last three years it had been stationary ; yet with these evidences of an innocent structure, the tumour in question presented unequivocal features of malignancy, and thus furnished a striking illustration of the difficulty attendant on the diagnosis of tumours by their history and external characters.

The several specimens of disease from this case are preserved in the Museum of St. Bartholomew's Hospital.

P.S. Since the occurrence of the foregoing case, M. Roux has presented to the Royal Academy of Medicine in Paris, a memoir on pulsating tumours, designated aneurisms of bone, containing the following histories of this disease.*

* Bulletin de l'Academie Royale de Médecine, séance du Fevrier, 1845.

A tumour originated in the lower end of the radius of a man 36 years of age. On compressing it, fluctuation with a crackling sensation was communicated to the fingers. It was punctured, and arterial blood flowed from the opening. The tumour then rapidly enlarged and began to pulsate. The brachial artery was tied in the middle of the arm, upon which the tumour became flaccid, and ceased to pulsate; it remained stationary for five weeks, and then again increased with the return of pulsation. The arm was now amputated, and on the ninth day after the operation the patient died with symptoms of purulent deposits and phlebitis. The lower fourth of the radius had disappeared. The tendons of the wrist were raised and lodged in grooves on the surface of the tumour; its interior was composed of cells filled with blood.

In a man 45 years of age, the head of the tibia enlarged with a projection from its outer side, the size of the closed hand. After the tumour had existed for several months, pulsation was discovered in it, but unaccompanied by bruit. The femoral artery was tied, the tumour immediately collapsed and ceased to beat, it gradually decreased, and ultimately disappeared, the head of the tibia completely recovering its form and size.

Other instances of pulsating tumour, originating in the tibia, have been recorded, wherein the femoral artery was tied, with the effect of arresting the progress of the disease; and in one instance, it is stated,

of completely curing it.* These, with the cases quoted from the Memoir of M. Roux, are to be regarded as examples of the variety of pulsating tumour of bone, wherein blood-vessels and blood-cells, constituting a sort of erectile tissue, are developed within the tumour. For the removal of such a simple vascular structure, the ligature of the principal artery of the limb may be effectual, but there must be difficulty in distinguishing this from the other forms of pulsating tumour originating in bone, and still greater difficulty in establishing a diagnosis between the pulsating tumour of bone and aneurism.

Two other cases of pulsating tumour, originating in bone, have been recorded, in which the main artery of the limb was tied, on the supposition that the disease was aneurism. One of these originated in the head of the humerus. On the 25th day after the ligature of the subclavian artery, profuse bleeding occurred from the wound, and the patient sunk. The tumour had diminished considerably, and it was found to consist of encephaloid substance.† The other case occurred in a soldier, nineteen years of age. As he was walking he felt a sudden pain in his left ham : on reaching home he found a swelling in the ham, which, in twenty-four hours, increased

* Leçons Orales, t. iv. Répertoire Général d'Anatomie, t. ii.

† Case of Medullary Sarcoma, engaging the upper portion of the os humeri, considered aneurismal, and for which the subclavian artery was tied above the clavicle. By John Nicol, M.D. Edinburgh Med. and Surg. Journal, July 1834.

to the size of a goose's egg, and it distinctly pulsed. The swelling increased, and the leg became cedematous. The femoral artery was tied, but the tumour continued to increase as rapidly as before the operation, and the patient sunk. The tumour was found to be firmly adherent to the periosteum of the femur and tibia. In its exterior were cysts containing a sanguineous fluid; its interior consisted in part of a fibrous tissue, disposed in lobes, and in part of a softer substance containing cells filled with serous fluid. The internal structure of the femur and tibia was healthy. The popliteal artery ran over the tumour and between two of the sacs of fluid on its surface, and through these it is stated that the pulsation had been communicated from the artery to the tumour. The right lung was converted into a brain-like mass.

In its mode of commencement, the disease in this instance presented so exactly the features of popliteal aneurism, that in the belief of its being so, the femoral artery was tied. The case is accordingly described as an instance of "excessively large fibrous tumour taken for an aneurism."*

* Observations in Pathology, by Dr. Kerst. Utrecht, 1839.