A Lecture

ON THE

ACUTE NECROSIS OF GROWING BONES.

DELIVERED AT THE HOSPITAL FOR SICK CHILDREN.

BY

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PASSING by the carious affections of bones for the present, I wish to speak of the acute necrosis of the long bones of children. This disease, from its frequent connection with general pyæmia and various local manifestations of general blood-poisoning, has attracted the attention of several physicians and morbid anatomists; and has of late been ably investigated in its pathological bearings by Mr. Stone, Dr. Bristowe, Dr. Wilks, and Dr. Kirkes; yet, since it has until quite recently met with so little recognition in the standard surgical works of the day, I shall venture to tell you all I know of the disease.

Through the kindness of friends, from published accounts, and from my own experience, I have collected twenty-three cases of this disease; and, as no description of mine can so clearly convey to your minds a notion of its character as an account of a case, I will relate to you some instances of the disease.

CASE I. Elizabeth Wootton, aged 3 years and 6 months, on March 8th, 1862, was noticed by her mother to walk lame. On examining the right leg, she screamed with pain; for ten days she continued getting worse; the thigh in the meantime became greatly swollen. On March 18th, the child came to my out-patient room. She was suffering under severe constitutional disturbance; the thigh was much swollen, tense, whitish in colour, and shining; the lower end of the femur was greatly enlarged and exquisitely sensitive to pressure. A poultice was applied and support was given; and three days afterwards she was admitted into the Children's Hospital, under my care. At this time, the thigh had still further increased in size, and the child was very ill, requiring stimulants and support. There was no sense of fluctuation over any part of the femur. On March 29th, an incision was made over the front of the middle of the thigh down to the bone, which was quite bare, but not rough. No pus escaped; but bloody serum in considerable quantity. No relief followed the incision; the limb remained as much swollen as before.

After a few days, a little bloody pus was discharged from the wound. The child took freely of wine, brandy, beef-tea, and eggs; but gradually sank, and died April 17th, a month after the time when she first came under observation.

Post Mortem Appearances, ten hours after death. There was found to be complete necrosis of the whole shaft of the right femur, excluding the epiphyses. The bone was entirely denuded of its periosteum, except the upper inch of the back of the femur, at the commencement of the linea aspera, over the part of bone bounded by the divergence of that line above. Between the periosteum and the bone, there was a collection of dark grumous blood—no pus. The upper epiphysis was loosely connected with the shaft of the bone, but was quite healthy, as also was the hip-joint. The lower epiphysis was separated from the shaft, but was itself

natural in appearance, as also was the knee-joint. The surface of the bone generally appeared white, and was hard; but just the lower end of the shaft where it joined the epiphysis, was softened and shrunken in its transverse measurement. The upper lobe of the right lung was completely solidified. The left upper lobe was solidified at its anterior part; its surface was finely nodulated, as if exudation had taken place in separate and distant lobules.

The heart was healthy; the liver fatty; the brain was not examined. The other organs were healthy. The bone has been preserved; and its present appearance confirms my description of it.

For the following cases, I am indebted to Mr. Marsh, the resident house-surgeon of the Children's Hospital.

CASE II. M. E., aged 11, a sickly child, was admitted May 30, 1862, into St. Bartholomew's, under Mr. Skey. A week before admission, the left leg over the tibia became swollen and painful. She had been treated for rheumatism before admission. When admitted, she was suffering from severe constitutional disturbance; the left leg and knee were swollen, very painful, and covered by a mottled redness. An incision was made over the tibia; about an ounce of ill-formed matter was let out; and the bone was found bare as far as the probe would reach. Wine and stimulants were administered. The subsequent course of the case was that large collections of matter formed, and were let out in the lower part of the thigh and from around the knee. The knee-joint remained much distended by fluid, though no supuration occurred in it. Two months after her admission, as she had fallen into a state of great exhaustion from the discharge, the limb was removed by Mr. Savory, just above the middle of the thigh; after this she made a good recovery. On examination of the limb, the tibia was found bared of its periosteum, and necrosed in the whole length of its shaft.

CASE III. A boy, aged 13, struck his left knee violently against a piece of wood. This was followed by severe pain, and by general febrile symptoms, with pain in the limb and joints generally. He was admitted into St. Bartholomew's Hospital eight days after the accident, in a typhoid condition, with symptoms of pericarditis, the left knee-joint being much swollen, and other joints being tender on pressure. Next day he died.

Post Mortem Examination. The periosteum of the left femur was completely separated from the lower three-fourths of the bone, except at the linea aspera; beneath it was a large quantity of brown gruel-like fluid, which was also largely infiltrated among the soft parts of the thigh. The bone itself on section looked natural. The right elbow and left hip-joints contained a turbid oily fluid; the other joints were healthy. The superficial and deep veins of the thigh were plugged by coagula, which in places had begun to soften. Secondary deposits were found in the lungs; and the pericardium showed traces of recent acute inflammation.

CASE IV. A boy, aged 16, was kicked on the shin, August 27th, 1862. Three days afterwards, he was admitted under Mr. Skey into St. Bartholomew's, with symptoms of general febrile disturbance. The injured leg was swollen, hot, red, and acutely sensitive to pressure from just below the knee to just above the ankle. There was no enlargement of either the knee or ankle joints. An incision was made over the tibia, and about half an ounce of ill-formed bloody and offensive pus was let out. The periosteum was found largely separated from the bone. Symptoms of pericarditis came on, and the boy died the next day—seven days after the injury.

Post Mortem Appearances. Indications of recent acute pericarditis were found. There were numerous secondary deposits in the muscular substance of the heart, in

the lungs, and in the kidneys. The periosteum was separated from the tibia on almost the whole of its anterior aspect, and to a considerable extent from the sides and back of the bone. Bloody serum was infiltrated among the tissues of the limb, and surrounded the shaft of the bone; which latter was inflamed and roughened on its anterior aspect.

CASE V. A boy, aged 8, knocked his shin against a coal-scuttle. Two days afterwards, he had rigors and pain in the leg, and general febrile disturbance. The third day he complained of a pricking pain in the left side of his chest. He was admitted into St. Bartholomew's Hospital, September 18th, 1862, under Mr. Skeg, with symptoms of acute pleurisy. The upper half of the left leg was swollen, red, and tender. An opening was made, and two drachms of sanious pus was let out; the bone was found bare beneath. He was ordered stimulants. After a while the discharge from the wound became very profuse, and he sank exhausted, six weeks after his first seizure.

Post Mortem Appearances. A large collection of pus was found in the pericardium; another, smaller, between the spleen and diaphragm; a third, beneath the rectovesical pouch of the peritoneum. The tibia, which I have before me, was found separated almost entirely from its periosteum, except at its articular ends; a fissure may be seen running obliquely down the bone, as if it had been fractured. Here and there the periosteum is separated from the bone by recent deposits of vascular and semi-ossified lymph, which adhere closely to both it and the bone. There is a circumscribed spot of ulceration just below the upper epiphysis of the tibia. The deposits of new bone upon this tibia indicate, as I believe, points where the periosteum was originally separated from the bone, but where the bone has not lost its vitality, they illustrate the rapidity with which new bone may be formed from the lymph effused by the vascular periosteum of a child.

CASE VI. A schoolboy, aged 9, fell on his left shoulder, or struck it, on February 26th. He made no particular complaint, but used it in the ordinary way, until March 1st. He then complained of pain about the shoulder, and felt unwell; took no food, and was dissipated. He was at once sent to bed; and Mr. C. Robinson saw him, and ordered four leeches to the injured part. There was no sign of fracture, but there was tenderness over the whole length of the clavicle and below it downwards towards the chest—it was firm and oedematous. A puncture was made half an inch below the clavicle; blood only escaped, and no relief followed. On March 3rd, Mr. Paget (to whom I am indebted for this account), saw him, and found considerable swelling over and about the whole length of the left clavicle; the swelling was ill-defined at its borders, and extended up into the neck, towards the nipple; but was not perceptible in the axilla; it was firm, doughy, and oedematous. The surface of the skin had a widely diffused pinkish tinge; poultices had been freely applied; the only part that was tender to pressure was along and over the line of the clavicle. There was much constitutional disturbance; the accompanying fever was not of a low type; great restlessness and wandering at night. He had had no shivering at any time. Leeches were ordered, followed by fomentations and poultices. On March 4th, the patient was better, though the swelling had gradually extended upwards towards the neck and chin. Next day, an incision over the clavicle, let out a teacupful of turbid pus, and gave the patient much relief; but the same evening his pulse rose; he became irritable and light-headed; his breathing more hurried; teeth, lips, tongue, and skin dry. The swelling over the clavicle was much diminished and began to discharge pus freely. Wine, opium, and support were freely administered, but he gradually sank, and died on March 9th, nine days after the commencement of his illness. Before death, the whole

of the swelling had subsided, the discharge being copious to the last. No *post mortem* examination was allowed.

The foregoing case—for the particulars of which I am indebted to Mr. Paget—I believe to have been an instance of acute necrosis of the clavicle, with death from pyæmia; similar to the case to which I shall next allude.

CASE VII. Mr. Jonathan Hutchinson presented this specimen, which I have before me, to the museum at St. Bartholomew's; it is numbered in the catalogue (258 series 1.) It is a clavicle with the neighbouring soft parts. The bone is dead, bare, rough, and is completely separated from its periosteum and its outer epiphyses. It was surrounded by bloody pus. It was removed from a boy, aged 5, who, after a fall on the shoulder, suffered from swelling, pain, and great tenderness over the clavicle. He died eleven days after the injury, and was found to have suffered from pericarditis and pleurisy.

The following cases I have extracted from the *Guy's Hospital Reports* for 1861; they are to be found in an article on Pyæmia by Dr. Wilks.

CASE VIII. James H., aged 15, fell and struck his right thigh; this was followed by swelling, and four days afterwards, he entered Guy's Hospital. Two days after admission, he was seized with rigors and pain in the side, swelling and pain in the joints. He died on the twenty-fourth day of his illness.

Post Mortem Examination. The soft parts of the thigh were infiltrated with pus; the femur was bare; the knee-joint containing pus; there was abundant evidence of general pyæmia.

In this case, the disease seems to have concentrated itself about the lower end of the femur and its lower epiphysis; not, as is more usual, confining itself to the shaft of the bone. The following cases afford instances of the same.

CASE IX. Thomas M., aged 16, was admitted with a swelling around the thigh, which was supposed to arise from injury, and from which the lad died in seventeen days.

Post Mortem Examination. There was an abscess in the thigh surrounding the lower parts of the bare femur, and involving the knee-joint; and abundant evidence of general pyæmia.

CASE X. Henry B., aged 16, struck his right knee against an anvil. A week afterwards, it began to pain him, and he felt ill. The knee began to enlarge; an abscess opened near it, and he died with symptoms of general pyæmia, five weeks and three days after the injury.

Post Mortem Examination. An abscess was found in the right knee-joint; the bones were bare; and there were evidences of pyæmic deposits in the lungs, heart, kidneys, and elsewhere.

The following five cases are taken from a paper by Dr. Bristowe in the *Transactions of the Pathological Society* for 1862. Dr. Bristowe states that, "in most of them the bones were extensively affected, often the whole shaft of one of the long bones being necrosed. In consequence of the rapid course of the disease, little beyond complete detachment of the periosteum, with suppuration around and sometimes within the shaft, had occurred. In one instance, however, in which the duration of the disease had been unusually long, a small quantity of new bone had been already deposited; in no case were the joint-ends materially affected."

CASE XI. A woman, aged 29, suffering great privation, was attacked with pains in the thigh, followed by oedematous, doughy, and pallid swelling. She was attacked

with rigors and delirium, pulmonary complications occurred, and in seventeen days she died.

Post Mortem Examination. The lower two-thirds of the femur were found almost completely denuded of the periosteum, and surrounded with thick pus. At one point, a good sized patch of soft granular new bone was found adhering to the shaft; the epiphyses and neighbouring joints were healthy; the medullary canal of the bone was full of puriform fluid. There were evidences in the body elsewhere of general pyæmia.

This case is worth noticing, since it is singular in respect of the age of the patient attacked; indeed, it is the only instance I have met with of a patient suffering from this disease after the complete ossification of the long bones.

CASE XII. A boy, aged 15, was admitted into St. Thomas's Hospital, his left knee being swollen, red, and tender, supposed to be due to cold caught after exposure to the heat of a furnace. The swelling extended downwards towards the leg. A large quantity of pus was let out from over the tibia, the upper part of the shaft of the bone being completely denuded of its periosteum. Symptoms of pyæmia set in, from which, however, he seemed to recover; finally, the whole shaft of the tibia became necrosed, and the knee-joint involved; and the boy died from phthisis, five months after his admission. No *post mortem* examination was allowed.

CASE XIII. A boy, aged 5½, after exposure to cold, had swelling and pain on deep pressure over the upper part of the right thigh, followed by abscess over the parotid region and left wrist. The femur was cut down upon, and pus let out from beneath its periosteum. He suffered from severe constitutional irritation, and died ten days after the commencement of his illness.

Post Mortem Examination. Almost the whole of the shaft of the left femur was found bare and bathed in pus; the cancellous texture of the bone contained purulent fluid; the pterygoid process of the sphenoid bone was necrosed, and formed the centre of an abscess. There were evidences of general pyæmia.

CASE XIV. M. G., a girl, aged 11, sprained her right shoulder, which became painful and swollen, and very tender. The swelling was in the region of the deltoid muscle. The child being very ill, a knife was pressed down to the bone, and a large quantity of pus was let out from beneath the periosteum. A considerable portion of the shaft of the bone below the anatomical neck was found bare. From this time her condition improved, and eight months after her admission, a large sequestrum was removed from the outer side of the shaft of the humerus, just below the neck. She was discharged cured, nine months after her admission; a result which, I think, we may in a measure attribute to the early recognition of her ailment, and the prompt treatment adopted.

CASE XV. A boy, aged 12, from no apparent cause, was attacked with pain in the right thigh, knee, and hip; there was no swelling nor redness. He was treated for rheumatism. The pain increased in his thigh; but on the day before his death, he got up and dressed himself. Next day, he visited St Thomas's Hospital, and died in the out-patient's room, after eight days illness.

Post Mortem Examination. The upper third of the right femur was found bare and bathed in sanious pus, collected between the periosteum and the bone. The diseased portion of bone was irregularly limited below; above, it was bounded by the capsule of the hip-joint. The cancellous structure of the bone presented here and there distinct accumulations of pus. Secondary abscesses and deposits were found in various parts of the body, giving indications of pyæmia.

I would point to this case as one typical of the disease under consideration; the early symptoms

resembling rheumatism, the disease with which acute necrosis is most often confounded; and I would caution you of the difficulty of recognising suppuration in an early stage around the shaft of the femur, particularly about the upper part of the bone; since there the covering of soft parts is so dense that it is long before swelling, redness, or fluctuation, make their appearance.

Of the resemblance of this disease in its early stage to acute rheumatism, the following case affords another example. It is taken from an account of some cases of Acute Necrosis followed by Pyæmia, by Mr. W. H. Stone (*Medical Times and Gazette*, 1859, p. 55).

CASE XVI. A healthy well formed girl, a domestic servant, aged 15, five days before her admission into St. Thomas's Hospital, began to suffer from severe pain in the left forearm, especially on its posterior aspect; it quickly began to swell. Next day, she was seized with rigors, vomiting, pain in the chest, and cough—with delirium at night. On admission, her general aspect was that of a case of rheumatism, with cardiac complication. The forearm was doughy, swollen, slightly red, in patches, tender on pressure; the joints were unaffected. She died on the day of her admission, on the sixth day of her illness.

Post Mortem Examination. The lower third of the left radius, with the exception of its epiphysis, was separated from its periosteum and surrounded with thick pus. The wrist-joint and epiphysis of the radius were healthy. There were indications of pyæmia in the lungs, pleura, pericardium, kidneys, and elsewhere.

CASE XVII. The following case is from the same source as the above. A boy, aged 15, injured his left leg in a fall down stairs; an abscess formed over the tibia at the seat of injury, and from this there was a profuse discharge. He was admitted a month after this injury into St. Thomas's Hospital, with symptoms of typhoid fever. The leg was swollen and tender, and a probe, passed into the opening over the bone, could be passed upwards and downwards for its whole length. Diarrhœa came on, and he died, forty-three days after the injury.

Post Mortem Examination. The whole shaft of the tibia was found bare and dead, and surrounded by pus. The joints at each end of the bone were healthy, and the epiphyses were unaffected. Secondary abscesses and other indications of pyæmia were found in the body.

These cases will serve to illustrate the prominent symptoms of this affection; such symptoms being, first, a local swelling, pain and tenderness, followed by constitutional fever and subperiosteal effusion, ending in abscess beneath the periosteum, or in the neighbouring joints, general pyæmia, with death from secondary affection of internal organs. The early symptoms, especially if pyæmia be rapidly developed, often much resemble those of acute rheumatism; and this on account of the swelling of the part first affected, the frequency with which joints remote from the seat of disease are attacked by pyæmic inflammation, and the pericarditis which so often complicates the disease. Thus it has happened that many of the cases I relate were mistaken for, and treated as, acute rheumatism with cardiac complication.

The tendency to pyæmic poisoning of the blood is the most characteristic difference between the necrosis of the young and fully grown adults. As I have before stated, I believe the predisposing cause of this affection to be the extreme vascularity of certain parts of the long bones, which, from their very position, are more exposed to external injuries and influences than other parts, and are, from their vas-

cularity, extremely prone to resent such injury by copious subperiosteal effusions.

All but one of the twenty-three cases before me occurred before the age of twenty; that is, while growth and ossification of the bone were still in progress. This will, I believe, account for more than half (or twelve) of the cases having commenced in the lower epiphysal end of the femur—the most rapidly growing epiphysis in the whole body, the first to appear in infant life, the last to disappear in adult age. It will, I believe, explain why seven of the cases happened in the tibia, which, next to the femur, is the most rapidly growing long bone in the body, and why of these cases the majority commenced in the upper epiphysis of that bone, an epiphysis which appears but a few days later than that of the lower end of the femur, and in which growth ceases somewhat sooner.

The local origin of this malady is frequently a blow of some sort. In twelve, or more than half of these cases, this was the assigned cause; six were not traceable to any cause; three occurred after exposure to cold; one was attributed to privation; one to a strain.

[To be concluded.]

CURIOUS CASE OF POISON: EFFECTS OF THE UPAS-TREE POISON. The *Abeille Médicale* states that a short time ago a scientific gentleman at Berlin received a small quantity of the condensed juice of the upas, and resolved to try the effects of it upon himself. One afternoon he accordingly took three grains of this drug, which he found very bitter and rather saltish. Immediately afterwards he felt extremely gay, and a bad headache which he had at the time disappeared; but after a while he experienced a sensation of oppression in the stomach. Nevertheless, he had the imprudence to go out; on turning a corner he became aware of a considerable stiffness along the spine; this was about half an hour after having taken the poison. An hour later, while taking a cup of coffee, he felt a violent shock throughout his body, and stiffness at the extremities; at the same time his head was thrown backwards, he lost all power of speech, but his mental faculties remained unimpaired. There was a slight remission of these symptoms for a few minutes, and then a fresh attack came on, and this continued until the patient at length succeeded in expressing a wish to be taken to the hospital of La Charité. As he was being helped downstairs to get into a carriage a new attack impeded his progress, but during the drive he had none, although the slightest shake seemed sufficient to bring it on. These attacks were attended with but little pain; deglutition was very difficult, and the patient felt very weak. After every attack the muscular system relapsed into inertness. At the hospital emetics were immediately administered to expel the poison if any remained; the vomiting was attended with sudden starts, spasms in the glottis, and difficulty of breathing; the latter symptom, however, soon subsided. The pulse was at 72. Thirty drops of laudanum were administered at the rate of ten for every quarter of an hour, and then thirty more, in three parts, at intervals of half an hour. The patient fell asleep, but was often awakened by the contraction of the muscles of the back and neck. Laudanum was again administered, and sleep returned. On the following morning the patient felt very weak, but only complained of stiffness in the left muscles of the neck; the pulse was at 66. Wine and light food were now given instead of medicine, and on the sixth day the patient left the hospital perfectly recovered. (*Galignani's Messenger*.)

Illustrations

OF

HOSPITAL PRACTICE:

METROPOLITAN AND PROVINCIAL.

ST. GEORGE'S HOSPITAL.

OBSERVATIONS ON CEREBRAL HÆMORRHAGE, FROM AN ANALYSIS OF FORTY FATAL CASES.*

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FULLY impressed with the importance of investigating any disease by the "numerical method," I am desirous of recording some general inferences arrived at on certain points in relation to cerebral hæmorrhage. These inferences have been induced from pell-mell accumulation of individual facts obtained from the records of forty fatal cases that have occurred at St. George's Hospital. In any inquiry of this kind, it is of the utmost importance to steer clear of all sources of fallacy which are so prone to creep into our individual facts, rendering our data a conglomeration of truth and error. For these reasons, I have carefully excluded in my analysis all the cases of merely congestive or simple apoplexy of Abercrombie, and also those which had not died, however marked the symptoms may have been. I have thus included only those which presented after death visible evidence of hæmorrhage within the cranium; and all these taken indiscriminately and heaped together quite independently of any preconceived idea of the disease. After all this careful scrutiny, I find I have notes of forty cases.

I shall examine these cases with the view of determining, if possible—

1. The prevailing symptoms which indicate an approaching attack of cerebral hæmorrhage;
2. The symptoms which exist after the lesion in the brain, leading to effusion of blood, has taken place.

I.—PREMONITORY SYMPTOMS.

The importance of studying these premonitory symptoms cannot be too strongly insisted upon; for by timely and judicious treatment, an attack might be effectually warded off, and not to return for a considerable length of time.

The following table shows the relative frequency of these different symptoms, excluding those cases (Sec. 6) of which the history is deficient or altogether wanting. The calculation per centage is made in proportion to 30.

Symptoms.	No. of cases.	Per cent.
1. Mental: Impaired intellect . . .	1	
Drowsiness . . .	1—2	6.66
2. Sensational: Cephalalgia. . .	4	
Vertigo . . .	2	
Nausea . . .	2	
Altered sensations in the limbs . . .	2—10	33.33
3. Motorial: Diminished power in limbs. . .	1	
Do. over sphincter . . .	1—2	6.66
4. Symptoms positively stated to be absent . . .	11	36.66
5. "Found insensible" . . .	5	16.66
6. History wanting . . .	10	
	30	99.97

* From papers read before the St. George's Hospital Medical Society during the sessions 1861-62 and 1862-63; and before the Western Medical Society, 1862-63.