

**Myeloid tumour with complete absorption of the shaft of the humerus, following double fracture--excision--death / by Shirley Deakin.**

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## ARTICLE XI.

MYELOID TUMOUR WITH COMPLETE ABSORPTION OF THE SHAFT OF THE HUMERUS, FOLLOWING DOUBLE FRACTURE ; EXCISION ; DEATH. By Surgeon SHIRLEY DEAKIN, F.R.C.S. Eng., Indian Medical Department.

THE following case is one of much interest, and in some points resembles a case recorded by Norris, in the *American Journal of the Medical Sciences*, 1842, mentioned by Bryant in his *Surgery*, vol. ii. p. 532. When I first saw the patient, four months after the accident, there was no thickening of the left arm. I could distinctly make out the two fractures, fairly transverse ones, at the junctions of the middle with the upper and lower thirds of the bone. The patient was a healthy young man, rather stout. I determined to try Colles', of Dublin, method of inducing union of the fragments. This plan, according to a note by Dep. Surgeon-General Norman Chevers, I. M. D., now of the London Hospital, in his articles on fevers and tropical diseases in the *Medical Times and Gazette*, 1883, consists in putting the limb in splints and administering mercury so as to "touch the gums." I accordingly put my patient on Plummer's pill, gr. v, twice daily ; after a month scarcely any constitutional symptoms had been induced, so I increased the dose ; after a fortnight no improvement had taken place, and I applied a small quantity of ung. hydrarg. locally. Nothing beyond decided sponginess of the gums was induced. The upper fragment appeared to be joining, and I hoped that the treatment would be successful. The fixity was, however, probably due to the tension caused by the growth of the tumour, for, eventually, I found that the fragments were as far from union as ever.

Shortly after this, as the patient began to lose flesh, he asked me to admit him as an in-patient to the civil hospital, which he entered on the 28th of September. At this time I had not a suspicion of the growth of any tumour ; the enlargement and tense, doughy feeling I attributed to oedema. The steady increase in the size of the limb and the gradual impairment of health now struck me ; the mercurial treatment had been exchanged for ammonia, iodide, and bark.

The question was : What was the nature of the tumour ? The youth of the patient, the oblong outline of the tumour, the absence of any bony hardness, the "semi-elastic feel, and yielding to the touch, an unequal sensation as to density," the position on the shaft of the bone, the integument covered with large full veins, suggested periosteal cancer. The absence of a bone shell, as far as could be determined by external examination, notwithstanding, from my previous experience during the past two years of three myeloid tumours, I was of opinion that the tumour was myeloid. I therefore determined to try and remove the part of the bone implicated, as I had recently successfully removed part of the radius for



To most intelligent observers of such an accident, the indication would doubtless be to prevent the entrance of the poison into the general circulation by means of a ligature or bandage, which should not be narrow, but quite broad and applied above the bite, or between it and the heart, it being of course understood that these remarks, as far as ligatures are concerned, apply to wounds of limbs. The bite should then be laid open by a crucial incision, care being taken not to injure bloodvessels; and suction should be made either by the mouth (in case no abrasions exist) or by cupping; this latter procedure may be made by means of ordinary surgical cups if available, by a small tumbler or wineglass from which the air has been exhausted by burning a small quantity of alcohol or spirits therein, or by means of an ordinary wide-mouthed bottle or can in which boiling hot water should be poured and quickly emptied. Alcoholic stimulants should be given in order to keep up the flagging heart, and the band should be loosened for a few moments at a time, in order that only a small amount of the venom shall enter the circulation. This process should be repeated, and the pulse will indicate when the proper amount of stimulants has been reached. It is not necessary to produce drunkenness, as it is believed that in some cases, especially of children, death has resulted, not from the snake venom, but from lethal doses of alcohol. In view of the recent researches of Lacerda, mentioned in the able paper by my friend Dr. Fletcher, from which I have so liberally quoted, the solution of potassa permanganas should be employed as an injection in the immediate vicinity of the bite. The strength should be a one per cent. solution of the salt in water, and, as the remedy is a chemical and not a physiological antidote, it is necessary that contact with the venom should quickly take place. In a number of experiments made by Dr. Lacerda, even when serpent venom was injected into veins followed by the permanganate, the salt was an effective antidote. As to the many reputed antidotes, Weir Mitchell has clearly proved that little or no reliance can be placed on them, and although it is not decided whether the formerly much-vaunted Bibron's antidote may not have some power to check, for a time, the dangerous symptoms, he thinks further experience will be necessary to decide upon its merits. Of course, after the acute symptoms of snake-bite have subsided, others would have to be treated according to the general indications. To those interested in the subject of antidotes and remedies for serpent-bites I would suggest an examination of the very valuable and exhaustive paper by Dr. Mitchell in the *North American Medico-Chirurgical Review*, 1861, v. 262.

Some apology is perhaps necessary for the length of this paper, but it is hoped that the importance of the subject may be a sufficient excuse, and that physicians throughout the country may be induced to record not only their successful cases, but those in which medical skill has proved unavailing.



myeloid disease. I was further driven to this operation by the refusal of the patient to have his arm amputated, as the movements and nutrition of his forearm were perfect. I was also anxious to save the limb.

The very free loss of blood, both during and after the operation, probably was concerned in the unfavourable result, the patient dying twenty-four hours afterwards; but the frequent vomiting and the great distension of the abdomen, and tympanites seemed to be due to some internal rupture inducing peritonitis and death from shock.

I. W. Turner, æt. 24 years; Eurasian, admitted to the Civil Hospital, Allahabad, on the 29th of September, 1883, and died from exhaustion on the 17th of November, 1883, following removal of myeloid tumour of left humerus resulting from fracture.

*Present History.*—On the 31st of March last, he got behind a *ticca gharry* (hackney carriage), bearing all the weight of his body on his elbows; the horse plunged forward suddenly, when he was thrown off on his left arm—the arm lying under him; he stood up immediately after and walked home, a distance of about 200 yards; he felt as though something were “rushing through the arm,” and he was unable to take off his coat when he reached home. A native doctor was sent for, and the left upper arm was put in splints for fracture of the humerus; after twenty-nine days the splints were removed, and the patient was made to use his arm by lifting light weights, after which the arm became painful and swollen, when it was again placed in splints. Three weeks after an eruption of “red blotches” appeared, scabbing over and lasting for a month; he was told it was *chicken-pox*;<sup>1</sup> this eruption was most marked over the injured arm, one or two blotches only appearing on the face; the arm continued swollen, but pain had diminished. Dr. Deakin examined the patient at the Colvin Dispensary on the 4th of July, 1883, when he found a fracture of the humerus in two places at the lower end of the upper third and at the upper end of the lower third. There was no union, and the ends appeared to be separated by a fluctuating mass. The patient was put under a course of mercury, producing slight ptyalism; this had apparently the effect of producing union of the upper fracture. This apparent improvement only lasted for a short time, as when next examined the middle fragment was again loose.

*Previous History.*—Had a chancre four or five years ago; has been in good health since, excepting an attack of fever once a year. Has two brothers, both of whom are living and in good health. (One brother, who is at present a guard on the E. I. R., states that when a boy he fractured his thigh-bone in two places; the fracture united, and he has never been troubled since.)

*Present Condition.*—Body muscular; left upper arm swollen from about three inches below the shoulder to about two inches from the elbow; skin hot, red, and having a glazed appearance; unable to move the arm without support, the forearm and hand are unaffected. On manipulation a feeling of fluid is imparted to the touch; the site of fracture can be distinguished by free movement above and below, leaving about four inches of thickened mass in the centre; no friction discernible.

<sup>1</sup> Smallpox was prevalent in Allahabad at the time; it is usual, however, to call mild cases chicken-pox, according to the predilection of the patient. In my opinion the two diseases—if they are two—cannot be distinguished.



Measurements about an inch below insertion of deltoid, right 12", left 14½". Pulse 90, equal in both wrists; temp. 98.8° F.; appetite good, bowels open; lungs normal; heart presystolic; bruit loudest at base and over subclavians; accentuated first sound; liver and spleen not enlarged; urine, phosphates in abundance; no albumen. Treatment, cold application; rubber bandage twice daily for half an hour. Pot. iod., grs. x; infus. cinch. f ʒj ter in die.

*Oct. 5th.* Arm much the same way; no pain except on deep pressure; sleeps well; tongue furred. B. N. O.; loss of appetite; temp. 98.8° F. right axilla; 99.2° F. left axilla. Treatment: omit pot. iod. and cold application; Ferri sulph. grs. ij; quinia sulph. gr. j; ext. aloes com. gr. ss, ter in die.—M.

*Nov. 1st.* The arm is gradually increasing in size; general health failing; mental depression; loss of appetite; no pain, except on pressure; unable to sit up or walk about for more than a quarter of an hour, as it causes a "tingling sensation" through the forearm; the bulk of the swelling is on the outer side of the arm, and at the site of the upper fracture; gives an obscure sense of fluctuation; the brachial pulsations can be felt conveyed through the outer and upper part of the arm; the radial pulse is good and equal to the right side; there is no loss of power in the hand or fingers; yesterday the swelling extended over the scapula and below the clavicle; this disappeared in a few hours after galvanism was applied; there has never been an increase of temperature beyond 99° F. since admission; galvanism ten minutes daily. R. Acid. hydroch. dil. ℥ xv; liq. strychnia, ℥ v; decoct. cinchona, ʒj, ter in die.

*14th.* There is a decided increase in the size of the arm within the past three weeks; it measures 15¾"; heat and redness greater; general health breaking down; no rise in temperature; no difference in radial pulses; the patient is feeling anxious about his arm, and has passed restless nights in consequence; lungs healthy; heart, loud presystolic murmur at base and along subclavians; accentuated first sound; no evident enlargement of liver or spleen; urine, sp. gr. 1020; no albumen; no phosphates; bile present; chlorides in abundance.

*16th.* As the patient is falling away in health visibly, it is decided to lay the tumour open by a free incision, and remove it.

4.30 P. M. Patient placed under chloroform (Junker's inhaler); rubber bandage applied from fingers up. After the arm was tied high up at the shoulder with rubber tourniquet, the bandage was removed and a free incision was made on the outer side of the arm. The rubber tourniquet controlled the hemorrhage until the myeloid mass had been scooped out for about five inches. There was free oozing of venous blood; a firm mass of brain-like substance (large-celled myeloid tissue) welled up from the centre of the incision. I removed the whole quantity with my hands, and found that not a trace of bony tissue remained throughout the whole length of the arm beyond the epiphyses. The shaft of the humerus was wanting. There was no shortening of the limb; the rapid increase in the myeloid tissue constituting the tumour had probably prevented this. The cyst containing the myeloid substance was probably the dilated and thickened periosteum—a dense, firm membrane, with irregular striæ over its internal surface, and very vascular. There was a large amount of oozing, though there were no large vessels to tie, and a large quantity of blood, probably not less than two pints, was lost. I had no hot water, temp. 125°, of which I have the highest opinion as a styptic, ready. I plugged the cavity with



large strips of lint soaked in tr. benzoin comp.; closed the wound with wire sutures; applied splints externally, and firmly bandaged the limb up to the shoulder. Sickness occurred after the operation—in my experience a rare occurrence when the anæsthetic is administered from Dr. Junker's inhaler—and repeatedly during the night. The patient remained almost pulseless, in spite of the application of heat to the surface, and of the administration of stimulants. Blood oozed sufficiently freely to stain all the dressings through, but not beyond this. During the following day there was no improvement; the patient was quite rational, able to talk, and fairly free from pain. The abdomen became much distended during the night, and vomiting occurred at intervals until the morning. Turpentine fomentations, enemata, and alkaline draughts gave no relief, the patient still remaining almost pulseless; heart beat regular; respiration much impeded by the abdominal distension; and the patient gradually sank, and died at 4.30 P. M., twenty-four hours after the operation.

The friends refused to allow a post-mortem examination.

ALLAHABAD, INDIA, December 5, 1883.

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#### ARTICLE XII.

THE TIME REQUIRED BY THE BLOOD FOR MAKING ONE COMPLETE CIRCUIT OF THE BODY.<sup>1</sup> By ROBERT MEADE SMITH, M.D., Professor of Comparative Physiology, University of Pennsylvania.

IN a paper published in the *Philadelphia Medical Times* for January 26, 1884, I gave an account of a new method which I had employed to measure the amount of blood thrown out of the ventricles at each contraction, and to determine the time required by the blood for making one complete circuit of the body. I there had occasion to criticize the method which has heretofore been employed to answer this latter question, and to point out some of its defects. I have recently been studying this subject from another point of view, and have obtained some results which strengthen the position taken in the article referred to.

It will be remembered that the method which has been employed for this purpose, the infusion method of Hering (*Ztschrft. für Phys.* Bd. iii. and v., and *Arch. für phys. Heilkunde*, 1853, p. 112), consists in injecting into one jugular vein towards the heart a solution of some salt whose presence in the blood can be readily recognized by chemical tests, and in finding how soon after the injection the salt appears in the blood coming from the head in the corresponding vein on the opposite side of the neck.

When thus injected, to reach the peripheral portion of the opposite jugular vein, the salt must evidently have passed into the right heart, through the capillaries of the lungs, into the left heart, through the carotids or vertebral arteries to the head, and through the capillaries of the head

<sup>1</sup> Read before the College of Physicians of Philadelphia, March 5, 1884.



or face to the jugular vein; or, in other words, must have passed through two capillary networks with their arteries and veins. It must, therefore, have completed an entire circulatory revolution. But to conclude that the time elapsing after the introduction of the salt into one jugular vein before it is found in the blood coming from the head in the opposite vein is the time required for one molecule of blood to pass from one of these points to the other, it must in the first place be admitted that the salt has been carried mechanically by the blood, without diffusing through it, with the same velocity as the blood itself; and in the second place to enable the formation of any opinion as to how often the entire mass of blood passes through the heart, it must be admitted that the velocity thus determined by the infusion method is the mean velocity of the blood mass. To show that both of these assumptions are unwarrantable is the object of the present communication.

I. *The Element of Diffusion in Hering's Method.*—Poissonville (*Ann. d. Sciences Nat.*, 1843, ii. ser. t. xix. p. 30) was the first, and as far as I know has been the only one to offer any experimental proof as to the falsity of the belief that the potassium salt was carried mechanically, as would be an inert body, by the blood. He repeated Hering's experiments on the horse, and was able to confirm his statement as to the time elapsing after the injection of the solution of potassium ferrocyanide before it appeared in the jugular vein of the opposite side; but he further found that this time was different for different substances, and was even modified by the presence of other substances when injected with the potassium ferrocyanide. Thus, while the time required for the circulation of the potassium ferrocyanide was *twenty-eight* seconds in the horse, when a little alcohol, in quantity insufficient to have any appreciable effect on the pulse and blood pressure as measured with the hæmadynamometer, was injected with the potash salt, the time of circulation was lengthened to *forty-five* seconds. Or, when potassium nitrate or ammonium acetate was administered under similar circumstances, the duration of circulation was reduced to *eighteen* or *twenty* seconds. In other words, he found that in the living body the rapidity of circulation of substances mixed with the blood agreed with the rapidity of flow of the same substances through dead capillaries or even through glass tubes.

It is, moreover, well known that if two fluids capable of mixing are brought into contact they will diffuse into each other with a considerable degree of rapidity, even when the mass of the liquid is at rest or when there is great difference in the relative volumes of the fluids; while if one fluid is poured into another with which it is miscible, or if agitated after the two fluids are brought into contact, diffusion is almost instantaneous. And as some force is always employed in injecting the salt solution into the vein, the mixture of this solution with the blood will be promoted,