ASSOCIATION OF MILK COMMISSIONS.

The California Association of Medical Milk Commissions will hold a meeting at Santa Barbara during the meeting of the State Medical Society.

The meeting will be largely devoted to a consideration of the problem of Bovine Tuberculosis and its relation to Public Health. Papers on this subject will be read by

Dr. Geo. S. Baker, Inspector in Charge, Bureau of Animal Industry, U. S. Dept. of Agriculture.

Dr. C. M. Haring, Prof. of Veterinary Science, University of California.

Dr. Chester Roadhouse, ex-U. S. Meat Inspector and Expert of the San Francisco Medical Milk Commission.

Prof. M. E. Jaffa, Prof. of Agricultural Chemistry, University of California,

and others.

LEWIS SAYRE MACE,
Chairman Executive Committee.

RAILWAY SURGEONS

OSTEOPLASTIC OPERATIONS IN PATHOLOGIC BONE CAVITIES.*

By D. D. CROWLEY, M. D., Oakland.

For many years the repair of cavities in long bones following the usual surgical procedure of removing dead bone or pus has been slow, uncertain and unsatisfactory both to the surgeon and the patient. My own personal annoyance in this field of surgery, for a very long period, has induced me to give the subject more than ordinary attention and has developed a technic that in my experience has shortened the period of repair over other operations, for this purpose.

The operation leaves no unsightly scar and but little depression of the bone surface. In leading up to the description of the operation, I would like the privilege of pointing out a few of the changes that take place prior to the formation of a cavity in a bone.

It is not within the scope of this brief paper to introduce in detail the pathological conditions leading up to the inflammation and the death of bone. It might not be amiss to say that any pathogenic germ necessary to inflammation and suppuration in other tissues may affect bone in like manner. Any disease that lessens the vitality of bone marrow may lead to a osteomyelitis, providing pyogenic organisms are present in the circulation of blood. Under like circumstances the same organism may excite inflammation of bone directly through a wound in the vicinity. The tubercle bacilli may invade an injured bone and extensive abscesses follow, entirely destroying the soft medullary structures and invading and atrophying the compact bone, forming sinuses through it and the external tissues.

Lexer and Bevan divide the infections of bone into three classes: Class 1—In compound fractures, amputations, joint resections, osteotomies in which medullary cavity or surface of bone stripped of periosteum is directly exposed to infection. Class 2—Suppurative inflammation of surrounding soft tissues may extend secondarily to bone. Class 3—The infection may be carried through blood by bacterial infected emboli.

The same authors in speaking of hematogenous suppurative osteomyelitis say that it may be caused by the deposit of bacteria in the bone marrow; the lodgment of infected or bacterial emboli; fusion of clumps of staphylococci in the finest capillaries.

The bacteria of inflammation and destruction of tissue may be carried by the blood directly, to the medullary cavity of bone and excite an osteomyelitis; thus inflammation extends from without, attacking the Haversian canals, obstructing the blood supply to the compact bone and causing total death of an area of bone. Also may a periostitis extend to the medullary canal causing death of bone. The pathological conditions brought about by inflammation of the soft structures of the body, are in no material way different from those of inflammation of bone. However the remedying of the fault is vastly different.

In a pathologic bone cavity there is an unyielding, uncollapsible wall. Walls so thin and friable, following the evacuation of pus, the removal of sequestrum, the shallowing of the bone cavity to assist speedy repair, that it would take but little force to fracture the shaft at the operative site.

Bone cavities have been treated during the past quarter of a century in different ways for the purpose of forming new tissues that would fill them and thereby make a strong bone and a sightly surface over the repaired area. Sponge grafting had its day and it did hasten repair by forming a frame work for granulation tissue. It was certainly better than no medium for that purpose. In another method the blood clot was allowed to fill the bone cavity after the soft parts were sutured. The clot was to act as a support to the granulation. The clot being a culture medium it frequently failed, as very often many of the bone cavities were septic. Flaps of skin have been used from the sides of the wound, forced into the bone cavity and held there by nailing them to the bone or by inverse suture. A septic condition would too often prevent repair and thereby sacrifice the flaps that were intended for that purpose. Another operation was the breaking of the edges of the involucrum, forcing the fragments into the cavity.

A few years ago I approached this method, by splitting away the edges of the bone, with a covering of all the soft parts including periosteum and forced the two masses into the bone cavity. This was followed by rapid repair as the tissues were aseptic and months had elapsed since initial operation.

Ten or twelve years ago plaster of paris was used to fill cavities as well as other non-absorbable substances. They have never become popular with surgeons.

Bone chips introduced to the profession by Senn, have met with success in aseptic cavities.

The Mosetig-Moorehof method is said to be one of the best recent methods of treating bone cavities. This method consists in filling the prepared bone cavity with a melted material which will not act as a culture medium or as a foreign body and is gradually absorbed as the repair work fills the bone and encroaches upon it. This material consists of 60 parts iodoform, 40 parts spermaceti, and 40 parts oil of sesame. (See De Costa's Surgery, p. 510, 6th Edition). A capillary drain is introduced and

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the periosteum and skin sutured over it. This method might be acceptable and prove very efficient in aseptic bone cavities, and it recommends itself to me as being the best of the methods already in the hands of the surgeon. The antiseptic in the material used does not permit us to altogether oppose its use in septic cavities where antisepticising and drying has been carefully done in preparing the cavity before its use. Well known surgeons in the East recommend it favorably. Dr. Milton of Oakland has been successful in two cases out of three. In the 3rd case (unsuccessful) he was unable to dry the cavity.

In the beginning of acute osteomyelitis, accompanied by extensive bacterial invasion, an incision may be made through the soft parts to bone. The skin and periosteum should then be separated from bone and retracted. Senn opposes the use of trephine and advises the chisel. The medullary canal is entered and if the inflammatory invasion is extensive, several small apertures are made rather than the removal of a large portion of bone covering the inflamed tissue. Frequently this inflammation presents itself to the surgeon in the intermediate stage when there is a purulent infiltration into the soft structures; the pus should be freely evacuated by incision and drainage and small openings should be made into the bone for the purpose of draining its interior. In the stage where the sequestrum is separated from neighboring structures, or where a cavity of the bone is filled with pus, and the involcrum is sufficiently strong to give necessary support to the bone the operator is called upon to remove the offending sequestrum, pus, granulation tissues, honeycombed bone and leave the cavity in a condition to undergo speedy repair. This is the stage where the operative interference is expected to be followed by repair, a repair that has been distracting in its slowness. In this stage I recommend the following operation:

In reaching the bone cavity the removal of a part of the bone wall in no material way differs from methods already in use by the surgeon, but I do maintain that the steps I follow in preparing and arranging the tissues for the purpose of rapidly occluding the cavity are so far as I know original with myself and have given me greater satisfaction in the rapidity of repair, strength of limb, and agreeable appearance of scar, than any other method that I have practised.

After the usual preparation of the skin has been carried out, I make an incision over the painful part of the bone, which is usually enlarged, down to the bone, or over a sinus leading from the bone. The periosteum and overlying tissues are separated from the bone en masse and are drawn well to the side by retractors. I have used the small trephine for the purpose of entering the medullary cavity but have frequently discarded it for the chisel, at other times used the chisel from the first and found it more satisfactory in cutting through the involcrum. The sequestrum is then removed, granulations curetted, bone curetted, sometimes a rounded chisel is gently used for removing the roughened interior. I leave no roof to the cavity, the shaft which in the beginning might be considered a tube is turned into a trough by cutting away the roof and part of sides of the shaft.

In a tubercular abscess of bone I have removed over the cavity of the bone, at least ½ of the circumference of the shaft. In a sarcoma of the medulla of tibia more than ½ of the circumference of the shaft was removed, the cavity of the remaining bone is sponged with carbolic acid followed by alcohol. All of the tissues are cleansed with gauze sponges and the cavity or trough in the bone is packed with iodoform gauze.

The end of the gauze is permitted to appear external to the skin at the most dependent end of the operative field, that it may at some future time be removed. In the lower one-third of tibia the gauze makes its exit and shows on the surface near the ankle. The gauze is so packed into the bone that the upper end is thoroughly filled and then inch by inch the folds of the gauze fill the entire cavity to point of exit. This method of packing from the remote part of cavity to the dependent end, facilitates its subsequent removal.

The cavity of the bone, now firmly filled with iodoform gauze, the skin and periosteum are next sutured; the skin and periosteum of one side is carefully stitched to the skin and periosteum of the other, with interrupted silk-worm sutures. If the skin and periosteum were greatly separated I would advise the periosteum to be first closed with catgut and the skin with silk worm gut. The skin and periosteum are not sutured at the most dependent part of the wound as the end of the iodoform gauze packing separates them and appears on the surface of the skin. Several layers of iodoform gauze are laid over and in contact with the wound; this is covered with sterile gauze. Bandage is then applied and the part put at rest. In four or five days the outer dressings may be removed and renewed. Between a week and twelve days following the operation, the gauze may be removed from within the bone, cavity cleaned out with moist gauze sponges and lastly with dry iodoform gauze. The cavity is again packed with iodoform gauze and surface cared for as in the first dressing.

The number and frequency of these dressings depend very much upon the septic or aseptic condition of the bone cavity. The surgeon must be guided greatly by the soiling of the external dressings. He may at first be compelled to change the bone gauze every four or five days. When the discharges are very slight, every week or ten days. In from fourteen to thirty days the bone cavity becomes very much smaller and but very little gauze can be used for packing. At the end of ten days to two weeks the silk worm gut sutures are removed as there is a good union in the periosteum and skin. When the cavity is free from inflammatory tendencies and reparative granulation tissue is sufficient and partly fills the cavity of the bone (about 30 days from operation) and when the discharges are only the result of repair, when it becomes difficult to introduce iodoform gauze for bone packing and drainage, it is then time to collapse the movable or flexible part of the wall into the immovable. The periosteum and skin that have roofed the bone cavity should now be utilized for the purpose of hastening repair. The skin and periosteum are cut through the first

line of incision; the same line of incision that had been so carefully sutured from drainage opening to uppermost part of bone cavity, and these soft yielding, elastic structures are permitted to fall or are gently pressed against the repairing tissues in the bone cavity, with little or no separation of the edges. Dressings are now applied over this secondary wound, without special cavity or sub-periosteal drainage. In a week or ten days the soft structures are usually repaired. There may be still a slight opening where drainage had been carried on from the first.

The advantage of this osteoplastic procedure over others is that the bone cavity can be treated safely until repair is well under way; during which time important structures, skin and periosteum are preserved until they are incised and collapsed into the bone cavity for final repair. The suturing of the wound in the periosteum and skin permits their repair, and when incised and collapsed these structures are well nourished, for the reparative process continues on the under surface of the periosteum while granulation tissue is forming in the bone. The skin and periosteum were sutured to prevent them from retracting and atrophying. When they are not sutured they are subsequently of little use in covering the defective bone. Preserving the skin and periosteum until the cavity is clean and repair well under way permits them to be utilized for final repair, shortens the usual surgical service of three, four, or five months, to one month, possibly a month and a half or two months. The real work of the surgeon is about 30 days.

Discussion.

T. W. Huntington, San Francisco: Dr. Crowley has introduced a subject of extreme importance in connection with bone surgery. There are few of us who have had our minds centered on this subject who have not had much to do with bone cavities. I am sure we have had our patients tired many times by the extreme slowness of these things to close up and get well. In procedures of this kind the main point is to get the cavity opened up in the first place; the wound should be packed and granulation watched for. To begin with I make a fairly good opening, cleanse the wound and wait for an opportune time for incising. As far as sepsis is concerned, take the thickening flaps, remove a little more of the bone, and hold the bone there. I think that Dr. Crowley's plan has some advantages, one that it prevents retraction of the flaps during the cleansing of wounds. Without careful handling there is danger of a septic condition during the primary and up to the secondary procedure. The whole thing rests in getting your original cavity thoroughly cleaned up. There is a thing which is frequently done in these cases which is a mistake and that is the long continued packing of these cavities. You will see these cavities packed and packed and packed for weeks and months when the packing could have been removed very much earlier and the process of repair hastened. We have not heard enough about the over-packing of wounds; it does not stimulate repair, it precludes repair.

A. Miles Taylor, San Francisco: This paper which Dr. Crowley has presented is a very interesting one to me. Some months ago I had some cases of bone trouble with which I had a great deal of difficulty in regard to the treatment, and through the advice of Dr. Crowley I pursued this procedure which he has mentioned to-day and in two of the cases I met with utmost satisfaction. Both cases I have discharged cured, one case within two months after the operation, the other six weeks after the operation; one was of the humerus and the other the tibia. I have to thank Dr. Crowley for suggesting and advising this method of operation. In the future I expect to pursue it in all cases of that nature that come under my care.

A. W. Morton, San Francisco: I am very much interested in the paper which the Doctor has just read. The methods pursued by most of us have been to open the wound, pack it and drain it; by doing that method our periosteum retracts, becomes torn and we are unable to cover the cavity. By stitching the periosteum over you get satisfactory drainage, and after getting the cavity in aseptic condition you get healthy granulation in the wound from the bone or from the periosteum. If the cavity at the time of operation can be thoroughly cleansed, as it often can, fill the cavity at the time. After thoroughly cleansing the cavity I then clean out with iodin and fill with paraffin that has been heated to 130° F., poured in hot so that the cavity is filled; it fills the space and becomes consolidated. Stitch the periosteum over it, close the skin without drainage, and if the cavity is thoroughly clean, you will have no trouble whatever. As far as I know in the literature I think this is entirely original and it is certainly to my mind a great advancement. I think the Doctor is to be congratulated on his paper.

REPORT OF A CASE OF ANEURYSM OF THE ABDOMINAL AORTA, WITH OPERATION AND INTRODUCTION OF WIRE.*

By J. H. O'CONNOR, M. D., San Francisco.

Family History: J. T., aged 53, married, 2 children, one died in infancy, the other is living and in good health. Father died at 48, cause unknown. Mother died at 47 of asthma.

Previous History: Smoked and drank moderately but does neither now. Had a chancre when about 20 years old, no distinct history of secondaries beyond a rash on left leg. Took treatment for one year, has had what he termed rheumatic pains all over the body for the last 8 years. Pains were dull in character and not confined to the joints.

Present History: Until 8 years ago patient was perfectly well; at this time he experienced pain of a dull, continuous character in the region of the navel. He consulted a physician who gave him pills (probably codeine) and the pain was relieved while taking same; had the prescription refilled on several occasions with the same result; some time ago stopped taking the medicine and since then has been suffering a great deal. The pain is less severe when his bowels move freely. About 18 months ago he noticed a swelling in the left hypochondriac region, and when feeling same noticed a pulsation. The tumor has slowly increased, he becomes dyspneic on slightest exertion, complains of coldness in the feet, has lost weight but does not know how much, feels distressed after eating and the pain in the region of the navel is much aggravated.

Examination: Fairly well nourished but has a peculiar yellowish color, pupils equal and react to

* Read before the Pacific Association of Railway Surgeons, August, 1910.