

ORIGINAL COMMUNICATIONS.

CLINICAL LECTURE ON SYNOVITIS AND GRANULAR DISEASE OF THE SYNOVIAL MEMBRANE—PULPY DEGENERATION, SCROFULOUS SYNOVITIS.

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GENTLEMEN, to-day we have to study diseases of the synovial membranes entering into the formation of the various joints of the body. Abnormal changes in these structures may originate in the soft textures surrounding a joint, or the morbid action may commence in the cancellated tissue of bone; but on the present occasion we shall confine our attention to affections originating in the synovial membrane. We may conveniently describe inflammatory diseases of the synovial membrane (synovitis) under three heads: the serous, muco-purulent, and the purulent; but you should distinctly understand that a division of this kind is employed principally for teaching purposes: in practice we constantly find these three forms of synovitis passing one into the other, in fact, a collection of pus within a joint must have been preceded by a serous and muco-purulent stage.

Granular disease of the synovial membrane, or pulpy degeneration of a joint as it is frequently called, depends on the formation of granular bodies in the synovial tissue and structures external to it; a latent predisposition (scrofulous), or an inherited tendency to this form of disease, is frequently called into activity by means of deranged nutritive changes consequent on inflammation of the synovial membrane, and so it is not uncommon to meet with instances of pulpy degeneration of a joint following synovitis induced perhaps by an attack of rheumatism, an injury or septic poisoning.

Excluding cases of synovitis resulting from a punctured wound,—an accident fortunately of rare occurrence—we seldom meet with instances of inflammation of the synovial membrane among children in our Surgical Wards, the greater number of cases of synovitis falling to the lot of the physician to treat being developed during an attack of acute rheumatism; but we are seldom without adult patients suffering from serous synovitis consequent either on an injury or else from chronic septic influence: a few cases arise as a consequence of syphilis. The joint most frequently affected is the knee, so that, for purposes of clinical instruction, I shall illustrate my remarks principally by cases of synovitis of the knee-joint, but you will understand that the ankle, wrist, elbow, or any other joint of the body may suffer from the various forms, or degrees, of inflammation I am about to describe.

Serous synovitis.—R. L., æt. 42, injured his right knee by a fall from a ladder. The accident was followed by pain and swelling of the joint, which has continued up to the present time, and has now obliged him to enter the hospital. On admission the right knee was very

swollen and painful, the pain being aggravated by pressure or any attempt to move the joint. The swelling extended upwards beneath the tendon of the quadriceps muscle, and was evident on either side of the patella: distinct fluctuation could be felt in the joint. There was no history of rheumatism, and the only joint implicated was the one that had been injured. With Dr. Dupre's surface thermometer we found that the temperature of the skin over the inflamed knee was one degree higher than the corresponding joint of the other limb. An elastic bandage was applied round the swollen joint, and a splint extending from the thigh beyond the foot so as to prevent the patient from moving his knee or standing on the right leg; under this treatment the synovitis rapidly diminished, and at the end of two weeks the patient left the hospital cured.

With reference to the use of the *elastic bandages* I refer to those recommended by Dr. Martin, made of india rubber or some such elastic soft material, usually about six yards long. When first applied in cases of synovitis they may cause some amount of pain, but this usually passes off in the course of an hour or two. I not unfrequently smear the skin of the inflamed joint over with an ointment composed of Extract of Belladonna, camphor and vaseline, outside this a layer of cotton wool is placed, and the whole is surrounded by the elastic bandage applied with as much force as the patient can bear without causing him constant pain; when using these elastic bandages the limb must first be surrounded from its extremity upwards with a linen roller, otherwise the pressure of the elastic bandage will naturally cause the foot to swell considerably.

The above case is a fair example of the course which the majority of instances of serous synovitis run if caused by an injury such as I have described, supposing they are carefully treated from the first, but everything depends on the early and efficient application of curative measures at the commencement of the disease, for, if permitted to continue, the synovitis may become aggravated into a muco-purulent form, or it may pass into a chronic condition; in either case serious mischief to the part may supervene, bands of connective tissue forming between opposed surfaces of the joint, or in the soft structures external to it, which limit the movements of the articulation and so render the patient perhaps permanently lame.

Serous synovitis, however, is often accompanied with more severe symptoms than those above described. For instance, a man in jumping from a cab sprains his knee: the joint in the course of a few hours becomes very painful and swollen. The injured knee feels hot to the hand, is red and inflamed, fluctuation can be felt in the joint, its temperature being a degree or two higher than that of the sound limb. Under these circumstances some three or four leeches should be applied to the skin over the joint, and subsequently for a few days the acetate of lead lotion with belladonna: a splint may with advantage be applied, and the patient must be kept in bed, and on no account be allowed to move the limb. It is well, in the first instance, to explain to the patient that confinement to bed or a sofa for a week,

and to his room for a fortnight, will in all probability be necessary for his recovery. If the patient has a tendency to rheumatism or gout, alkalies, vinum colchici, with iodide of potassium, spare diet, and a few doses of blue pill and colocynth may probably be prescribed with advantage. The difficulty in these cases is to induce our patients to undergo the necessary restraint, without which it is impossible to ensure their recovery. Whether the injury has occurred to the knee, wrist, or any other joint, no sooner does the pain subside than the patient usually insists on moving the limb, and so he frequently keeps up the hyperæmia and synovitis, and thus the articulation grows stiff with constantly recurring periods of pain after exertion, due to the stretching of the thickened tissues which have formed in or around the joint during the acute stage of the disease.

The contents of a joint affected by synovitis such as I have described, if drawn off by an aspirator will be found to consist of translucent albumenoid fluid more limpid than the naturally viscid secretion of the part. The surface of the synovial membrane if examined in the recent state is vascular, much resembling in appearance the conjunctiva when effected by catarrhal inflammation.

The point, however, which I would insist on, is that in a very large majority of cases of even severe traumatic synovitis with rest, a few leeches, cold applications and belladonna, and perhaps counter-irritation subsequently, the disease will not pass beyond the stage of serous effusion, but, so long as the joint is painful, absolute rest must be enforced, a splint in all cases being if possible applied, and counter-irritation in the form of the Linimentum Iodi used over the skin after the more acute symptoms have subsided; we frequently meet with instances demonstrating the ill effects following a neglect of this practice.

S. H., æt. 20, was admitted into the hospital on the 3rd of December; the patient was a strong, healthy girl; she had never suffered from rheumatism; there was no family history pointing to hereditary disease. About a month since S. H. fell and injured her right knee, the joint became excessively painful during the night after the accident and throughout the following day; subsequently she was compelled, from the nature of her employment, to move about; she was however seldom free from pain. Tincture of iodine was applied to the joint, but the patient was unable to rest the leg until she came into hospital. On admission we found the knee distended with fluid, the temperature of the joint constantly a degree or two higher than that of the other limb; the patient was kept awake at night by the involuntary starting of the leg. Movement of this kind produced the most violent pain; her suffering was aggravated by pressure made over the joint, and she was unable even to put her foot to the ground. No other joint of her body was affected. I drew off the contents of the distended synovial membrane by means of an aspirator, it consisted of a turbid straw-coloured muco-purulent fluid.

Immediately after this fluid had been removed we

applied a layer of Extract of belladonna over the joint, outside this cotton wool surrounded with an elastic bandage, bound round with force sufficient to keep up considerable pressure on the part. The limb was then fixed to a splint. After about fourteen days of this treatment counter-irritation by means of the Linimentum Iodi was substituted for belladonna, and in the course of three weeks the patient was able to move about the wards; she ultimately left the hospital perfectly cured.

As I have already remarked, it is impossible to draw a hard and fast line between cases of serous and muco-purulent synovitis, but as a rule we may affirm that a persistent rise of temperature in an inflamed joint two degrees or more above that of the corresponding healthy joint is an indication that muco-purulent inflammation has occurred in the synovial sac; it is only in articulations such as the knee and elbow, which are not surrounded by any thick muscles, that we are however able fully to appreciate a local rise of temperature of this kind. The inference we draw from a persistent local increase of temperature is that the alteration in the nutrition of the serous membrane necessary for the formation of muco-purulent matter is more likely to lead to new growths in or around the part, or to end in a condition of chronic synovitis, than in the serous form of the disease marked by a high temperature at first, but after a day or two's rest, with local temperature hardly exceeding that of the sound limb; and hence the necessity for greater caution and patience in the treatment of the more severe forms of disease. Moreover, if a synovitis accompanied by a persistent and marked rise of temperature, or in other words a muco-purulent or purulent inflammation be allowed to run its course, it is not improbable that the abnormal action may so far affect the nutrition of the articular cartilage, ligaments or bones as to lead to degeneration and perhaps necrosis of these parts, and consequently to bony or fibrous ankylosis. As an instance in point, F. S., æt. 25, was transferred from the medical to the surgical wards on the 5th of March; she was then suffering from intense pain in her left knee; none of the other joints of her body were affected. F. S. had been in good health until about six weeks before her admission into the hospital, when her left knee became swollen and painful without any assignable cause; she has since been in the medical wards for a month, and has taken alkalies, Iodide of potassium, and so on; the joint has been freely blistered. On coming under my care the temperature of the left knee was for three days always two and a half degrees higher than the corresponding joint of the other leg; the patient was always in constant or severe pain; she complained much of the limb starting at night; the joint was greatly swollen, but the skin covering it was neither red nor inflamed.

The patient was feverish and had severe rigors: she was much depressed. I drew off the contents of the joint by means of an aspirator; and then applied belladonna and pressure as in the last mentioned case, the limb was flexed and kept absolutely at rest. On examining the fluid from the synovial sac it was found to be straw-coloured and muco-purulent.

The patient was relieved for a time, but fluid very soon re-accumulated, and I emptied it on several occasions by means of an aspirator, the actual cautery was carefully and persistently used and almost every other means of treatment employed, but no improvement took place; and, after an interval of some weeks, it became evident more decisive measures were necessary. I had the patient placed under the influence of ether, and then found crepitation between the femur and tibia, the joint was therefore laid open freely on either side of the patella, and a probe having been passed through one of these incisions, its extremity was pushed through the joint and made to protrude the skin in the popliteal space, the integument was incised and drainage tubes passed through the joint from before backwards, and another from side to side, thus procuring free drainage from the joint through the popliteal space.

I then cut several of the ham-string tendons and broke through adhesions so as to relieve the joint from tension. A splint with an arched iron rod was applied along the anterior surface of the thigh and leg so as not to interfere with drainage from the wound in the popliteal space.

Antiseptic dressings were not employed in this case, because I was anxious to save the patient the pain and inconvenience attending their use, and I felt convinced we did not run much risk of absorption of putrid material either through the ends of the bones entering into the formation of the knee joint or the surrounding tissues, the inflammatory process existing in the locality for so long having in all probability produced sclerosis of the ends of bones and induration of the soft tissues around the joint to such an extent as to protect the system from septic poisoning; the free and dependent opening from the knee was also intended to prevent putrifying materials collecting in the joint.

I need not trouble you with details as to the subsequent treatment of this case; the patient gradually recovered, and after four months interval was able to perform her duties as a maid of all work although she has ankylosis of the knee joint.

I would here observe that this is an exceptional case. I by no means advise you to cut into a joint, although its condition be such as I have described, unless you are convinced that the patient's health is failing under the effects of the disease. A careful temperature chart should be kept, and the condition of the pulse and the digestive organs noted, especially the latter, for, so long as a patient can take food and assimilate it, recovery is always possible, and, as you know perfectly well, our patients no less than those whose duty it is to attend them, have often been rewarded through the exercise of that indispensable virtue, patience. In no class of cases is this principle more needed than in instances of diseases of the bones and joints. Sometimes counter-irritation, especially the actual cautery aided by rest, Scott's dressings with well applied pressure, will often hasten the recovery, and as the acute symptoms pass off the Plaster of Paris bandage is invaluable, enabling a patient to be removed from bed, and, weather permitting, to be taken into the open air or from one room to the other. In not a few cases, if the fluid from the joint is

drawn off by means of an aspirator and Scott's ointment is then employed together with an elastic bandage, the patient will rapidly improve. Subsequently, by counter-irritation and rest, the functions of the joint may ultimately be restored.

On examining the condition of a joint affected with muco purulent synovitis, we find that its internal surface is intensely congested and swollen, and the articular cartilages on their free surface will have assumed a fibrous structure, and in many places degenerated so that softened patches if not cavities will be detected on the surface of the cartilages. This condition of the cartilages is due not only to abnormal action going on in the synovial membrane, but also to changes effected in the circulation of the blood through the cancellated tissues of the end of the bone produced by the inflamed condition of the structures surrounding the joint.

If the articular cartilage and the sub-cartilaginous layers of bone are destroyed before sclerosis has occurred to seal the ends of the cancellated tissue, the medulla sprouts from the extremities of the contiguous bones, ossification occurs, and so firm union takes place between the bones precisely as in a case of fracture. I have specimens here which demonstrate the fact that bones united in this way grow together so completely that it is impossible to make out either their line of union or the position of the joint which formerly intervened between them.

Formation of fibrous bands.

Changes, however, such as I have described seldom occur in a joint except in neglected cases of muco-purulent or purulent synovitis, but, as I have before remarked, it is by no means an uncommon thing after any severe or long-continued synovitis to find that fibrous bands have formed outside, and occasionally within the synovial membrane, binding contiguous surfaces of bone to one another, and so impeding the movements of the joint. Under these circumstances, every time a patient attempts to extend the limb, these fibrous bands become stretched to such an extent as to cause considerable pain to keep up constant irritation and so to give rise to recurrent synovitis in the joint.

In cases of iritis we may often watch the formation and growth of neo-plastic formations (the outcome of inflammatory action) which, growing between the iris and the capsule of the lens, bind these structures together; supposing synechiæ of this kind have caused the outer part of the pupil to become adherent to the lens, it follows that every time that portion of the pupil which is free dilates and contracts under the influence of light, it drags on the fixed part of the iris, and this traction keeps up an irritation producing fresh attacks of iritis and more synechiæ, so that occlusion of the pupil may be the result; but, if in the early stages of the disease we break down the bands of adhesion between the iris and lens causing the pupil to dilate freely by means of atropine, we arrest further ill consequences, at any rate so far as the mechanical difficulties I have referred to are concerned. And this is very much what happens in cases of chronic or severe synovitis. The soft structures external to the synovial membrane become involved

in the inflammatory action going on in the joint, and so bands of indurated connective tissue are produced, it may be between the outer or inner condyle of the femur and the tibia or fibula. These bands have a tendency not only to contract as all tissues of the kind have, but they frequently form while the limb is flexed, that is during the time inflammatory action is going on in the joint, and so, as I explained, the articulation becomes fixed.

The following cases illustrate this point.—H. K., æt. 18. There was no evidence of tubercular or any other form of hereditary disease in this instance, the patient had been in good health until August when he was struck by a piece of machinery injuring his right knee; from the time of the accident he suffered from almost constant pain in the joint. When admitted into hospital on the 24th of November, the right leg was slightly flexed on the thigh, so that when he attempted to walk his toes only touched the ground; but any effort of the kind caused him so much pain in the knee that it was with difficulty, and only by the aid of a stick, that he could move about the wards. On examining the part we found the joint slightly swollen, its temperature was normal; there was a particularly painful spot over the inner part of the head of the tibia, the pain was increased by pressure made on this locality, and still more so if an effort were made to extend the leg.

Under these circumstances the patient was placed under chloroform, and I forcibly extended the limb; while bringing the leg straight I felt one or more bands of adhesion snap as I broke them from their attachment to the bones; when once extension had been completed there was no difficulty whatever in moving the limb with perfect freedom. The following day the patient was able to put his foot to the ground, he soon regained his power of walking, and had no further inconvenience, although the joint remained weak and required support with an elastic bandage for some time.

The nature of the accident, the symptoms from which the patient suffered, and his condition on coming into hospital pointed clearly to neglected synovitis followed by the formation of bands of adhesion between the femur and tibia; it was evident that, whenever the patient attempted to walk, or in fact to extend his leg, these constricting bands were stretched to such an extent as to cause him considerable pain and practically prevent his moving about.

There was no question as to the synovitis having been the effect of an injury, and, what was important in the treatment of the case, there was no suspicion of tubercular or other disease of the bone which might have made us hesitate to forcibly extend the limb. I mentioned to you a symptom present in this instance which is generally noticed in uncomplicated cases such as those I have described; it was the fixed local pain in the neighbourhood of the joint, increased by pressure; and, in making extension while the fingers were applied over the spot pointing to the attachment of bands of adhesion to the inner part of the head of the tibia, the indurated connective tissue at the time of the operation might clearly be felt to give way with a snap, after which the joint could be moved with perfect freedom.

There is a natural hesitation on the part of surgeons to interfere in cases of this kind, or rather to use force in breaking down adhesions in a joint which has recently been inflamed; the idea is that such rough treatment may set up acute symptoms and then do more harm than good. With ordinary care, however, and presuming that we have made a careful diagnosis, there is really no likelihood whatever of our doing any mischief while forcibly extending a limb under these circumstances in the case of an adult patient. With children greater care is necessary, because it is possible, if much force is employed, that we may break off the end of the bone or detach the epiphysis from the shaft. Moreover, in children we are more apt to meet with strumous disease of the bone with synovitis, which may be the most prominent symptom together with a stiff joint consequent on reflex irritation of the surrounding muscles, which, if the patient is under the influence of chloroform, stand out as tense cords and cannot be mistaken for the rigid bands resulting from fibrous adhesions such as I have described, these bands may be safely broken down if ordinary care be taken to stretch them gradually and to keep a firm grip on the ends of the bone while force is being employed to move the limb.

Hydrops Articulæ.—Another consequence of neglected serous or muco-purulent synovitis is, that the disease may become chronic; one of the ill effects arising from this is, as I have described to you, a condition known as chronic rheumatic arthritis. Another result of long-continued synovitis is a state of the joint usually known as "Hydrops articulæ," which most commonly appears in the knee, and sometimes the elbow. The synovial sac becomes greatly distended with fluid, fluctuation can be felt in the joint. At first sight the disease resembles advanced rheumatic arthritis, but there is no enlargement of bones, and the cartilages are not unfrequently comparativelyatively healthy. The fluid contained in the joint is generally yellowish in colour and coagulates on the application of heat, but I have also seen the contents of a joint under these circumstances of glairy almost tenacious consistency. The patient complains of stiffness of the limb but seldom of much pain, and he is generally able to move about although the distended synovial membrane is necessarily a great inconvenience.

We occasionally, however, meet with cases of long standing synovitis and distension of the membrane with fluid in which active changes occur from time to time, and are liable to be excited by the slightest exertion, so that practically the patient is incapacitated from gaining his living, and in fact almost completely confined to his chair or couch.

The treatment of these cases of distended synovial membrane resulting from chronic synovitis must depend upon the age and general health of the patient. In the case of elderly people, especially if of rheumatic or gouty temperaments, we should hesitate very much before doing anything more than applying counter-irritation to the skin over the joint and supporting the part by means of an elastic knee-cap.

On the other hand with younger persons, and even in those advanced in life if of sound constitution, especially

should their bread depend upon their power to work, we may, if the condition of the joint is such as to prevent their gaining a livelihood, with the aspirator draw off the contents of the joint and inject a solution of one part of tincture of iodine to three of water into the synovial membrane, treating the synovitis very much the same way as we should an hydrocele. Our object is to establish a slight amount of inflammation in the part; we consequently allow the injection to remain in the synovial membrane; on withdrawing the aspirator the external wound should be covered with collodion and the limb carefully kept at rest on a splint, until the inflammatory action has subsided. You cannot be too particular as regards resting the limb on a splint after injecting a joint in this way. I have opened the joints of a considerable number of cases in this manner, and as yet have never seen excessive inflammatory action excited in the articulation; some of these cases have done remarkably well, and none of them, so far as my experience goes, have suffered any ill consequences from treatment of this description.

On the other hand if in a young person, the contents of the joint are found not to be liquid but gelatinous in consistency, it is very probable the case is one of pulpy degeneration of the synovial membrane, and under these circumstances simply injecting iodine into the joint, although it may do no harm, will hardly produce any beneficial effect on the disease.

(To be continued.)

CONTINUED FEVER AT ADEN.

BY SURGEON-MAJOR HUBERT GREENE, A M.D.

(Concluded from page 198).

CASE No. 5.—Private H. Dempsey, age 29; time in India 5½ years. This man was in hospital for a few days the latter end of January suffering from fever, for which he received the usual quinine treatment, and was

discharged apparently well on the 28th of that month. This morning (8th February) his temperature is 103·4°, and there is great debility and anorexia.

February 9th.—Slight gurgling in right iliac fossa: no tenderness or spots. Three stools yesterday: two during the night. Tongue moist: edges red. Unable to sleep and is extremely weak.

10th.—Slept all night, having taken 3ij Liq. Morphiae. Abdomen normal. Suffers from considerable deafness, and is extremely feeble. Appetite very much improved. Continue quinine, 20 grains daily.

11th.—Sweated profusely yesterday: slept fairly: pulse improved in quality.

12th.—Slept well: bowels normal: less perspiration: deafness remains.

14th.—Heavy perspiration last night: saturated bed clothes.

16th.—No perspiration last two nights: slept fairly: no head symptoms.

18th.—Saturated sheets last night: feel better. Continue quinine.

21st.—Every two or three nights has severe perspirations which necessitate entire change of bedding. Appetite good; not gaining strength.

22nd.—Complains of pain in left shoulder and knee.

24th.—Says pain in left knee is worse: no heat or swelling. Sleeps and eats fairly: tongue clean: bowels sluggish: urine normal. Quinine 5 grains thrice daily.

March 5th.—Feels better: pains nearly gone: sleeps and eats well.

10th.—Has had severe night sweats lately, but nevertheless seems to improve; appetite good. Is still a little deaf.

17th.—Discharged to light duty with a view to his obtaining change of air at "The Isthmus" outpost.

26th.—Passed an Invaliding Board, being recommended for change of climate to England.

April 7th.—Sailed in H. M. S. Himalaya. N. B.—His condition has not improved much since his discharge from hospital.

Temperature and Pulse Record.

February.

Date.	8	9	10	11	13	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Day of disease	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Morning temp.	103·4	103	104	101·2	100·6	101·8	100	102·4	104·2	101·8	101·6	98·6	98·8	99·2	98·6	99·2	99	99·2	98·5	99·2	99
Evening temp.	104·8	104·6	102	101·6	101	103·2	101·8	104·6	103·4	102·6	104	101·2	102·6	101·4	101·8	101·2	..	100·6	101·8	101·2	101·8
Pulse	..	..	100	120	92	80	..	..	96	88	88	..	..	..	..	..	..	92	..	..	..

March.

Date.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16					
Day of disease	..	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38				
Morning temperature	98	99	100·2	100	100	100·2	101	100	99	100	98·2	98	97·6	97·2	..	97					
Evening temperature	101·8	101·6	104	102·2	102·2	102·5	102·8	102·6	99·2	102·6	100	101	100	..	98·5	..					
Pulse	..	..	..	100	100	92	100	96	92	102	92	80	78	..	..	*128					

* Standing.