Some further notes on the etiology of ulcerative stomatitis or cancrum oris / by Alfred Lingard.

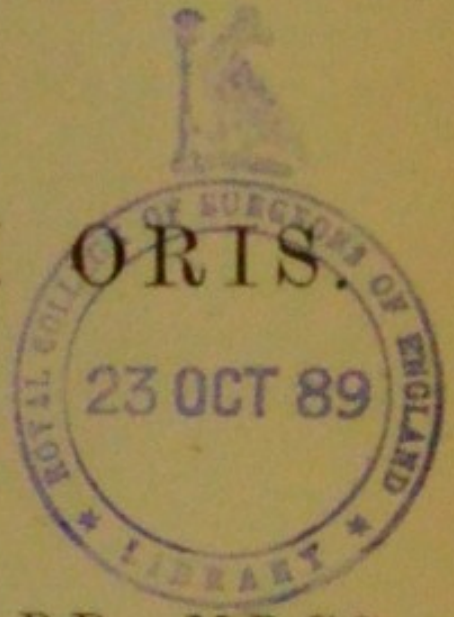
SOME FURTHER NOTES

ON THE

ETIOLOGY OF ULCERATIVE STOMATITIS

OR

CANCRUM ORIS.



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ETIOLOGY OF

ULCERATIVE STOMATITIS

OR

CANCRUM ORIS. (a)

In a previous communication I have described the occurrence of what appeared to me to be the same disease in the human subject, monkeys, and calves. The disease which I described previously affects the tongue and cheek, and secondarily the lungs, both in human subjects and in animals. A form of gangrenous pneumonia, apparently produced by similar micro-organisms, has also been observed by me in the lungs of five horses. Portions of the affected tissues inoculated in calves produced a disease resembling noma in all respects. The essential characters of the micro-organisms in all cases were similar. They consisted of long thread-like growths, the individual threads being made up of small bacilli varying in length from 0·004 mm. or less, to 0·008 mm. or more, and about 0·001 mm. in thickness. These organisms were found in great numbers at the line of extension of the necrotic patch. Cultivations have been made from five cases in the human being, in one case in a monkey, in two cases in

(a) Investigation carried out in the Brown Institution Laboratory.

young pigs, in numerous cases in calves, and in the lungs of horses. It was then demonstrated that the inoculated disease is characterised by appearances precisely similar in those seen in the original disease. I wish here simply to enumerate the lesions found in the heart at death in the human subject, and in animals inoculated from other animals of different species, suffering from ulcerative stomatitis or noma. The most serious conditions are those presented by rabbits after inoculation in the ear with the affected tissues from the young pig and calf. These animals die on the tenth or eleventh day after inoculation. The ear is found to be very much increased in size from the inflammatory process, and has been found to weigh fifty-one grammes when the healthy ear only weighed twelve. As in the two cases some differences were observed at the necropsy, I will give a short account of the condition of the pericardium and heart in each.

Case 1. *Rabbit inoculated from the affected tissue of the pig.*—On slitting up the pericardium the heart was found to be enveloped by a thick, pale-coloured false membrane one-eighth of an inch in thickness, which on microscopical examination was discovered to be composed of long bacillar threads matted together. Under this membrane in the muscular substance of the heart were found yellow necrotic patches, the largest was seven-eighths of an inch in length by three-quarters of an inch in breadth, forming the apex of the heart. On section this necrosis was proved to involve the whole thickness of the left ventricular wall. The left coronary artery was distended, and gave the impression to the touch of a thick and hard piece of cord. The lungs and liver were similarly affected.

Case 2. *Rabbit inoculated from the affected tissues of the calf.*—The pericardium contained little or no fluid, but a membrane covered the surface of the heart about one-twelfth

of an inch in thickness, which on microscopical examination was proved to be formed of fibrin, while numerous cells were entangled in its meshes containing a large number of granules, also very numerous ammonio-magnesian phosphate and oxalate crystals. On removal of the membrane from the surface of the heart, several masses of yellow necrotic tissue became visible, involving the muscular structure of the apex of the left ventricle; and others were found, smaller in extent, over the upper portion of the left ventricle anteriorly and posteriorly. On section, as in the previous case, the necrosis was found to involve the whole thickness of the muscular wall, and so extend into the interior of the left ventricle. After hardening these tissues in Müller's fluid, different portions were submitted to microscopical examination. It was then found that, as in the case of the mouth (*a*) so in the heart substance, the necrotic process was coextensive with the advance of a mass of bacilli. The lungs were similarly affected.

On section of the muscular wall of the heart some small necrotic foci were observed, but there were many that could not be recognised macroscopically. These small foci, when examined with a power of 200 diameters, are found to be circular in shape. In the centre of the patch are a large number of thread-like organisms, which have rapidly increased, probably, from one or two deposited there in the first instance. Neither structure nor nuclei were to be observed in this area, owing to the nourishment having been abstracted at the expense of the cells as the bacilli gradually invaded the healthy tissue. Just outside the principal zone of bacilli there were stray or single ones between the muscle fibres, and in this situation were a few leucocytes dotted

(*a*) The *Lancet*, May, 1883; and "Micro-organisms and Disease," by E. Klein, M.D., F.R.S.

about, while still more externally was seen an extensive zone of leucocytes surrounding the patch, which was evidently due to the inflammatory process which had started there. In many places I found these organisms in varying numbers infiltrating the intermuscular tissue and surrounding the capillaries and lymphatics. In these cases they appear like long bundles or leashes of circular contour passing along the lumen of the vessel. I also found various collections of leucocytes in the inter-muscular spaces, in groups varying in size according as they contained only a number which could be counted, or as they contained so many as to make it impossible to number them. I always found one or more elements of the threads, either well-formed bacilli or round dots, which were obviously spores. In the coronary arteries and their smaller branches supplying the cardiac structures I came across vessels of different calibre, the walls of which were more or less infiltrated by bacilli. In the larger the lumen of the vessel was occupied by a granular substance which did not stain, evidently the remains of a blood-clot. In the centre of this clot were seen knotted skeins of threads, which readily absorbed the aniline dye. There were also seen solitary bacilli, as well as groups of the specific bacilli, in different parts of the clot in immediate contact with the intima of the vessel. The intima and elastic laminæ were not invaded by these organisms; but all the rest of the arterial coat was destroyed, and consequently all definite structure lost, its place being entirely occupied by myriads of wavy threads.

In the human heart, in consequence of the early death of the patient, such serious lesions are not met with. In the five necropsies I have made on children dying of noma, I have only once found heart lesion, and that was characterised by the presence of petechial spots, about from ten to twelve in number, of a dark-red colour, dotted over the surface of

the heart immediately beneath the exocardium. On closer examination these spots were found to be slightly elevated above the surrounding tissue. Microscopically, these petechial elevations presented a smallhæmorrhage raising up the exocardium, whilst the apposed portion of the muscular bundles of the heart was surrounded by a varying number of blood-corpuscles. On very careful examination I was able to verify the presence of organisms—always micrococci or diplococci—which had gained entrance to the circulatory system from the grumous material always found in the cavity of the mouth, &c., in such cases. In no instance was I able to discover the thread-like growth or bacillus nomæ.

Although I have not yet completed my investigation of cancrum oris in the human subject and the above-mentioned animals, the facts I have detailed justify me in publishing them as far as they go. We should hardly expect an animal to live with necrotic areas of tissue in the substance of the heart; that it can do so is a new and startling fact in the history of pathology. We should have been prepared to find the necrosed portion give way, and death ensue rapidly.

This is the only organism yet described that appears to be purely and simply a tissue destroyer, invading and reproducing itself in its course over healthy areas, and leaving nothing in its wake but a mere skeleton of what previously existed. The tissue thus invaded is sucked dry as it were, the organisms in contact with the necrotic parts in like manner undergoing similar changes, their centrifugal advance depending upon fresh formation at their periphery. As in the case of a fly sucked by a spider, the fly is dead, but its outward visible form is present, and capable of easy recognition, though the protoplasmic elements entering into its composition have been deprived of their vitality by the process. The fly is present, but at the expense of its attributes. So in the case of the tissue changes observed in animals. We are able to

distinguish muscle fibres, but *minus* their striæ, areolar tissue, fibrous tissue, and the several coats of vessels, though the outline of the special elements entering into their composition is wanting, the elastic lamina, however, remaining intact. All are present in a more or less perfect condition, yet sapped to their vitals by the devastating horde invading their territory. That the small veins and capillaries are seriously affected by the immediate presence of these organisms is evidenced by the inflammatory changes noted—changes induced to stem the tide and offer a barrier to impending invasion, but all in vain. The occurrence of ammoniomagnesian phosphate and oxalate crystals in the pericardial false membrane is unique, and possibly accounted for by the fact that these crystals are always found when pure cultivations of these organisms are made in fluid media.

I hope, in a future communication, to illustrate all the morbid conditions described above by drawings which I have had carefully prepared at intervals during the past five years, as well as to show cultivations illustrating the *materies morbi* in each animal.