Observations on the muscularity of the hepatic and cystic ducts, as explanatory of the production of jaundice by moral causes / [Robert Knox].

OBSERVATIONS

ON THE

MUSCULARITY OF THE HEPATIC AND CYSTIC DUCTS,

AS EXPLANATORY OF THE PRODUCTION OF JAUNDICE BY MORAL CAUSES.

READ TO THE MEDICO-CHIRURGICAL SOCIETY IN EDINBURGH,

March, 1836.

During the year 1835, so far as I can recollect, the "Lancet" reported some valuable clinical lectures, by Dr Anthony Todd Thomson, and amongst many carefully detailed cases, there were some remarks on the occasional sudden appearance of jaundice, in cases wherein there could be no suspicion of any permanent obstruction to the course of the bile from the liver into the duodenum. I examined these cases, but did not find any one in which the jaundiced appearance came on very suddenly; the yellow colour of the integuments appeared slowly in most of them, or, at least, they did not correspond in any way to the case which I have now the honour of submitting to the consideration of the Society.

During the winter of 1821, whilst pursuing some pathological inquiries in Paris, and naturally watching the progress of symptoms in the cases themselves, there came into the

Hospital "La Charité," under the care of Dr Lherminier, a young man, apparently about twenty years of age, healthy in every respect, so far as could be judged of, but deeply jaundiced. The medical visits of the Parisian Hospitals, as perhaps most of the Society are aware, are at six a. m. or soon afterwards. I mention this circumstance because it bears on the case. A well conducted inquiry, with acute cross questioning, elicited from the patient the following statements; I call them statements although they are facts, as much so, at least, as we generally obtain in medical investigations.

On the evening previous to his admission into the Hospital, this young man was perfectly well, but chancing to pass a Corps de Guarde, he came so suddenly and unexpectedly on the sentinel that the first notice he had of the soldier's presence was the gun and bayonet ruffling his chest, and the naked point striking the breastbone with considerable violence. During the night, he became deeply jaundiced, and fancying himself seriously hurt in some way or other, he applied to the Hospital very early in the morning, soon after which we saw him.

I do not imagine that any difficulty would have occurred in eliciting the facts of the case, and as regards those just mentioned, none did occur, but the physician had very early hinted that the patient could not well be a man and be thus terrified at a bayonet, and that he must be a tailor. This roused the ire of the patient, the more so that M. Lherminier's conjecture as to the patient's trade turned out to be a true one, and gave rise to a series of extremely witty repartees on the part of patient and physician, which ultimately brought out the whole facts of the case. From these it appeared that up to the moment of the rencontre with the sentinel he was in good health.

I have often reflected on this very singular, and to me unique case, and although such must have been seen by others, by M. Lherminier, for example, I do not find them recorded any where. It has a singular interest phisiologically, and has led me to re-examine frequently the apparatus of the bile, and more especially the bile ducts. I shall here take the liberty of submitting the results to the Society.

The structure of the ductus communis choledochus, the ductus hepaticus, and ductus cysticus, has been described with the utmost care and fidelity by Soemmering, and no doubt by many anatomists both prior to and since his time. The greater number agree with him in describing the ducts, including the gall bladder, as being composed, first of an inner

membrane, reticulated, but firm; secondly, exterior to this, a cellular lanuginous, or cellulo-fibrous tunic, but not muscular; thirdly, in respect to the gall bladder, a partial covering, furnished by peritoneum; and in respect to the ducts, an investing cellular tunic, derived seemingly from the capsule of Glisson, but not closely adhering to the second tunic, and indeed scarcely to be enumerated with propriety as one of the tunics. Now, so far as this description goes, it is both brief and faithful, with the exception, however, of the intimate nature of the second tunic, which a few have thought merely cellular, others celluloso-fibrous, and others distinctly muscular.

Amongst those who deem it muscular, I shall only notice some valuable remarks by Dr Monro,* because they have been brought forward in a more distinct manner, and with a greater shew of proof, anatomical, physiological, and pathological, than any of the others. I shall not take it upon me to say in what respect his views may be original, but to me he seems to have preceded others in publishing these opinions.

The proofs offered by Dr Monro for the muscularity of these ducts may be strictly reduced to the following heads: — First, It is inferred that the longitudinal muscular fibres of the intestines, though not visible in many parts of the gut, are yet present; and therefore there may exist muscular fibres in the bile ducts, although they are not visible. But I fear that this argument, drawn from analogy, is untenable: when not visible, these fibres are not present. Secondly, "The gall bladder is said to adapt itself on all occasions to its contents, and also assist in expelling these." These are good arguments, but scarcely come under the head of proofs. What follows is different, and more decisive. "It also contracts in a living animal when mechanically irritated, (which I have seen to take place for the space of half an hour, by which it somewhat resembled an hour-glass.") I am not aware that this experiment has succeeded in any other hands; and farther on, at page 28, the doctor himself remarks, that "these ducts (the biliary) seem to possess the contractile muscular power in an inferior degree to the ureters, for stimuli applied externally to the gall bladder, or the common biliary duct of a living animal, do not excite such an evident motion or contraction as takes place in the ureter."

These are interesting experiments, and merit repetition, particularly with a view towards a reconciling of the statements,

* Observations on Spasm of the Gall Ducts by Dr Monro. Edinburgh, 1826.

which the attentive reader will observe are somewhat at variance with each other. The ureter is not generally believed to be muscular, or to shew decided motions when irritated by mechanical stimuli. But no where can I find any decided proof of the muscularity of these ducts, or any description of the course of the fibres. Thus having failed to discover them on pretty frequent inspection, I long doubted the fact of these ducts being in any shape muscular; but recent observation has partly removed these doubts. The muscular fibres, however, are disposed in a quite different way from what we might expect. I shall here mention the mode in which they were examined. My remarks at present apply exclusively to man. The ductus communis choledochus being laid open, its inner membrane is first seen, highly reticulated, but gradually becoming less so when traced into the ductus hepaticus, and so on towards the liver. On forcibly raising this up, a muscular layer is raised with it, on examining which carefully it may be seen that the fibres run in most directions; the inner membrane, it may be remarked, having but little the appearance of a mucous membrane, and the reticulated appearance seems owing to the arrangement of the muscular tunic outside of it; but on this point I do not speak confidently. Outside this muscular tunic there is a cellular one, which follows the hepatic ducts throughout their course, and is seemingly derived from the capsule of Glisson. This cellular membrane, divisible into two or three layers, and not essentially a tunic of the duct, prevents the muscular tunic of the duct from coming in contact with the parenchyma of the liver. It seems absent, however, around the small branches of the hepatic ducts. In like manner, the cellular capsule surrounds and follows the branches of the vena portæ and hepatic artery, preventing their proper tunics from coming in contact with the substance of the liver, until at least their branches have greatly diminished. It forms in fact a loose sheath for them, so that the walls of the arterial branches, being delicate and unsupported, partly collapse when cut across. There is no such investing tunic around the venæ hepaticæ.

I have thus endeavoured to shew by intuitive evidence, that the bile ducts are muscular, for the same structure was observed in the cystic duct, and though less marked, in the gall bladder. If correct, and all those acquainted with such inquiries will admit the difficulty of being certain on a much disputed point like this — if correct, no other proofs, whether pathological or physiological, are required. The question is

simply, is the second tunic of the gall bladder and bile ducts muscular or not? I take the liberty of remarking to anatomists that they will find neither circular nor longitudinal fibres, strictly so called, but fleshy fasciculi running in any other direction but circular or longitudinal, and I feel almost satisfied that the difficulty hitherto experienced in being convinced of the presence of these fibres has arisen from their course not having been fairly described.

Dr Andral has with much ingenuity supposed, that fleshy fibres might be developed in these ducts by obstruction, such as that arising from gall stones, &c.; and he also argues in favour of the muscularity of these ducts, from what takes place in the gravid uterus, compared with the unimpregnated one, inferring that a rudimentary structure exists constantly, which only under peculiar circumstances may become decidedly muscular.* To this argument I may venture to add the very distinct muscularity of the dartos observable in some muscular individuals, though not uniformly so, and the accidental formation of muscular fibres between the fibrous and serous layers of the pericardium, twice seen, so far as I know, by unbiassed observers. The first case occurred to Dr Nihell, who edited Solano's Observations on the Pulse, and the second to Dr Wolff, a pupil of the distinguished Tiedmann. But there are difficulties attending these cases which it is unnecessary to consider at present.†

The analogies drawn from comparative anatomy are not always applicable to human structure, but it may have its weight to state that I have found the ureters of the whale *(Balæna Rostrata)* distinctly muscular.

These observations, drawn partly from physiology, partly from pathology, and partly from comparative anatomy, will no doubt have their weight with some. The case itself related in the commencement of this paper renders almost certain the possible occurrence of jaundice in a seemingly healthy person during the course of a single night, and from a moral cause. To explain a phenomenon of this kind, the physiologist infers

* It is right, however, to observe, that an obstruction occurring in the course of these ducts, whether biliary or of the ureters, has never appeared to me in any way to increase the muscular appearance of their tunics.

† These cases, the first by Dr Nihell, the second by Dr G. L. Wolff, are very remarkable. In both, distinct muscular fasciculi were formed, in consequence of inflammation betwixt the serous and fibrous layers of the pericardium. See Dr Nihell's work on the Pulse, likewise Tractatus Anat. Patholog. sisters duas Observationes Rarissimas de Formatione Fibr. Musc. in Pericardio atque in Pleura obvia genesi, &c. G. L. Wolff, Heidelberg, 1832.

a spasm of the bile ducts, and he naturally enough infers that the bile ducts must be muscular, thus taking for granted the very fact which it is required to prove. A hasty inference like this of necessity leads to great laxity of reasoning; it encourages young surgeons to speak vaguely about spasms of the urethra, and it is rather curious that medical pathologists of this kind have not bethought themselves of spasms of the ureters, about which they might write a great deal, with but little chance of being refuted.

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