LECTURES

ON THE

PRINCIPLES OF SURGICAL DIAGNOSIS:

ESPECIALLY IN RELATION TO SHOCK AND
VISCERAL LESIONS.*Delivered at the Royal College of Surgeons of England.*

By F. LE GROS CLARK, F.R.C.S.,

Surgeon to St. Thomas's Hospital, and Examiner in Surgery in the University of London.

LECTURE III.

Pain—Sleep—Objective Signs; viz., Deformity, Colour, Transparency, Temperature, Consistence, (Edema, Crepitation, Crepitus, Fluctuation—Diagnostic Value of Treatment.—Shock—Definition, Causes, Physical, Mental, Toxicemic, Predisposing.—Effects at Different Ages—Railway Collision—Effects of Shock on Nerve-Centres; on Heart—Temperature in Shock, and Reaction—Shock in Relation to Operations—Value of Stimulants in Diagnosis—Causes of Fatality in Shock.

MR. PRESIDENT AND GENTLEMEN,—Of the many expressive monosyllables, whether of Saxon or Latin origin, with which our copious language abounds, probably there is not one which awakens more thrilling emotions when it is uttered than the word "pain". In its etymology, the scholar discovers an association with the penalty and punishment of sin, whilst the physiologist, with a gentler and more tolerant construction, does not view it as an unmixed evil, but prefers to place it in the same category with labour, and to regard its conservative office as qualifying its penal character—a compensation whereby the curse is mitigated, and in one respect made a blessing. Pain is familiar to all; the wailing cry of infancy ushers in existence, and the moan of suffering is rarely absent from the bed of death. It is the lot of some to suffer much; of others to have comparative immunity from pain; some bear it with fortitude, others are restless under it; probably some frames are naturally more sensitive than others; and this circumstance of relative sensitiveness merits consideration in estimating the value of pain as a diagnostic symptom.

The character of pain varies as remarkably as its degree of intensity. A whole vocabulary of epithets has been employed in denoting the sensations of suffering patients. Many of these expressions are very graphic; and the alliance between the special character of the suffering and disease is often a valuable element in identifying the nature of a malady. The throb of suppuration, the gnawing pain of articular caries, the plunging or lancinating pain of cancer, the tearing pain of rectal fissure, the scalding pain in urethral inflammation, are a few of the characteristics to which I allude. Then, again, intermittent pain often distinguishes so-called neuralgia from inflammation; pressure may relieve the former, but rarely fails to aggravate the latter; and the converse result is obtained when the temperature of the affected part is artificially lowered. In syphilitic osteitis, for some unexplained reason, the suffering abates during the day, and is augmented at night; and there are often similar exacerbations in arthritis. Pain which is evoked by pressure varies likewise much in its nature and degree.

The acute tenderness in peritonitis, the sensitiveness of inflamed pericosteum or in joint-disease, can scarcely be mistaken, though they may be so simulated by hysteria as to deceive the unwary or inexperienced. The progress of an abscess is often marked by the character of the accompanying pain; and its abatement denotes the yielding of superjacent textures, and the approach of pus to the surface. In acute inflammation, the anguish of the patient is sometimes converted, and that speedily, into comparative ease; as, for example, in strangulated hernia; this symptom, perhaps a relief not only to the patient but his friends, is differently interpreted by the surgeon; he knows it is the fatal indication of gangrene. Sympathetic pain is frequently a significant guide in diagnosis, and supplies valuable information to the surgeon. Such, for example, as pain at the orifice of the urethra in stone in the bladder; pain in the testicle when a stone is traversing the ureter, or that which exists in the knee in hip-disease. In some structures, the presence of pain suggests or confirms the existence of inflammation, as in bone, and in serous and synovial membranes, which are but little sensitive in health. Pain, if long continued or severe, is exhausting; but, *per se*, very rarely fatal. I think the shock of pain is much over-estimated. It is difficult to separate from the suffering the effects which are due to concurrent causes in operations; but it is certain that great and almost con-

tinued pain is compatible with protracted life. I have known some remarkable instances of this fact; and, although I appreciate to the full the value of chloroform, I am not aware that operations are rendered less fatal by its agency in securing the patient from suffering. Of its influence in shock, I shall have something further to say by and bye.

Though not an easy transition in fact, yet it seems a natural one, in considering these subjects, to pass from Pain to its antidote, "Nature's soft nurse", as our poet designates it in his beautiful apostrophe to Sleep. Apparently partial and fickle in its visits, as he describes it, yet there is always a reason for its absence, its restless presence, or its protracted sojourn; and, therefore, its peculiarities repay a careful study, and merit a passing notice as a valuable element in diagnosis. Sleep is rest of brain; or, to use the language of advanced physiology, "in natural sleep the exhausted nervous system is storing its reserve; when it is fully charged, there is resistance and awakening." Muscular rest alone is unrefreshing; the nervous energy is unrecruited. It is vain to seek repose by shutting out the external world in silence and darkness; this alone is insufficient to

"Steep the senses in forgetfulness."

The busy brain must relax its hold of the objects of its accustomed pursuits; Nature's gentle pressure must weigh the eyelids down, and all the organic functions must sympathise by their more tranquil rhythm. The sound, unruffled sleep of health must be distinguished from the deep sleep of exhaustion, as well as that resulting from the opposite condition of vascular repletion, whether temporary or more persistent, when it verges on coma; as in threatening apoplexy or the advance of organic change in the brain. The drowsiness or stupor into which the wild mania of the earlier stage of a typhoid condition degenerates, would appear to be due, as already remarked, to the presence in the brain of uneliminated organic products, and indicates approaching dissolution.

But we often learn more from the absence than from the disturbed conditions of sleep. A restless night is frequently the first note of alarm to the surgeon in the after-treatment of an operation; it ushers in febrile derangement, or precedes the fatal rigor of pyæmia. Wakefulness characterises all forms of nervous excitement, unrest then being the typical condition of the brain; thus, in nervous and drunken delirium, in the constitutional irritation consequent on loss of blood and other depressing causes, the want of sleep reacts upon and aggravates the excitability of the brain. This state of wakeful delirium, combined with a quiet pulse and diminished sensibility to pain, is diagnostic of nervous excitement. The sleep from opium which visits the brain in this condition is deep, prolonged, and undisturbed; but the sleep, in febrile or inflammatory diseases, whether natural or artificial, is usually troubled by distressing dreams, tumultuous, incoherent, perplexing, or alarming, and abruptly broken by startled wakings; dreams such as De Quincey experienced in the depth of his wretchedness, and describes in his poetical *Confessions of an Opium-Eater*—not of that cast which Queen Mab brings with her, but a bewildering medley of scenes and circumstances, of thoughts and feelings, which oppress the struggling slumberer, and prompt him to seek relief in wakefulness.

A lower degree of nervous excitability is characterised by light, uneasy sleep, and frequent wakings, when the intellect seems to stagger for a time before it recovers its equilibrium. As the loss of natural sleep is often the first harbinger of ill, so its return inaugurates a favourable crisis in disease. The reaction following the shock of a serious operation rarely permits sleep of any duration during the first succeeding night; and the suffering entailed is often sufficient to interrupt rest for some time subsequently. Yet, in some instances, where the relief from exhaustion and pain is decided, as in the removal of an acutely inflamed and suppurating joint, the patient may at once recover the ability to sleep.

Setting aside the susceptibilities of individual patients, there is much to be learned, in diagnosis, from watching the effects of anodynes in procuring sleep. In nervous irritation, opium tranquillises, but in excitement from vascular repletion, it can rarely be borne; yet, the exceptions resulting from idiosyncrasy or habit render it unsafe to trust to the influence of this drug, without other concurrent testimony, in distinguishing between these two conditions. The only assistance that I am aware of which chloroform affords to the surgeon in diagnosis is, that by its agency he is enabled to make a more searching examination than he otherwise could, to verify the suspected presence of disease or injury.

The *Objective* signs which it behoves the surgeon to study, appeal directly to the senses. Thus, the altered form and colour of any part are recognised by the eye; the consistence and temperature by the touch; odour and sound, severally, by the appropriate organs. A few observations on each of these will suffice.

Altered form, or *deformity*, may result from various causes, both in disease and injury. It is one of the leading features by which we

recognise fracture and dislocation, and distinguish various diseased conditions of the skeleton. Under the title of swelling, it is one of the characteristics of inflammation, and the nature of tumours is partly determined by their form. In some instances, deformity is indirectly indicative of existing disease, as in the outgrowing shoulder in lateral curvature of the spine, and consequent distortion of the ribs; or the existence of œdema in the lower part of a limb, resulting from vascular obstruction higher up; or, again, the presence of psoas abscess in the groin in lumbar caries. The period at which any marked change of form was first observed, its sudden or gradual appearance, its variations under different circumstances, and the influence of remedial agents upon it, are all conditions which are available in diagnosis, and require the careful scrutiny of the surgeon, whose anatomical skill and accuracy are thereby not infrequently put to the test. I would remark that, in conducting these investigations, it is often requisite to ascertain by comparison whether there is any deviation from strict symmetry between corresponding parts on opposite sides of the body; and I find that such inquiry is more satisfactorily conducted where one sense alone is employed at the time. Thus, in suspected injury at or near to the shoulder-joint, the eye should be allowed first to scan the upper part of the chest in front and at the back; subsequently the surgeon should place himself behind the patient, and trace with both hands simultaneously the outline of the shoulders, from the sternal extremity of the clavicle outwards, until the examination is completed. I think much advantage accrues from these separate observations, and that the independent testimony of each sense is, in the aggregate, more valuable than when two or more are employed simultaneously.

Of colour, as generally diffused over the surface, I have already spoken; it is more valuable to the physician than to the surgeon. But the latter is much indebted to its local manifestation as a diagnostic sign of considerable importance. In various types and stages of inflammation, the colour of the affected part is of material assistance in determining the nature and treatment of the disease. The diffused and rosy blush of erythema is distinguishable from the deeper hue of phlegmon or erysipelas; the broad and often dusky red cord which marks the course of an inflamed vein, does not resemble the more delicate and pink thread by which we trace an inflamed lymphatic. The approach of pus to the surface is indicated by the colour of the skin; and the dark dye of a stagnating circulation warns the surgeon of the incipient stage of a condition which will probably terminate in the ashy hue of gangrene. By its colour, ecchymosis is distinguishable from other effusions, and its different stages are indicated by its progression through the varying tints of the rainbow. Transparency reveals the fluid nature of a tumour, and its limpid character likewise, as in hydrocele. In ulcers and in healing wounds, the colour of the surface guides the surgeon in his treatment; and the copper hue of eruptions betrays the taint of syphilis. In hæmorrhage, the anxious inquiry of the surgeon is respecting the colour of the blood; or, again, the presence of bile in the alvine excretions, or a loaded condition of the urine, may be ascertained by their appearance.

It is principally by the sense of touch that we inform ourselves of temperature, consistence, fluctuation, and other allied sensations. Both locally and generally, temperature is useful as a diagnostic sign. It is raised in an inflamed part, and its permanent depression or loss indicate lowered vitality or mortification. Of the variations in temperature over the surface generally, and even locally, where there is no inflammation, I shall have to speak by and bye. I will not, therefore, enlarge on this subject now; but would add that this is a field of investigation which offers a rich harvest in its cultivation.

It is by their consistence principally that we distinguish tumours; but this is not infrequently a deceptive sign when exclusively relied on. The information it conveys is often masked by superjacent textures, or disguised by the presence of some accidental concomitant circumstance. Thus, the hardness of a mammary tumour is suggestive of its scirrhus character; but this sign is possessed in common by cancer and by chronic inflammation in this organ. Osseous growths may lose their characteristic hardness beneath a thick covering of muscle; and a soft tumour may have a firm resisting feel imparted to it when bound down by dense tissues. Thus, in a case under my care, the diagnosis of a large fat tumour beneath the pectoral muscle was obscured, until it made its way behind the clavicle into the neck, when its true character was revealed, and I removed it. A large inguinal hernia, which recently came under my notice, had taken the unusual course of extending itself beneath the aponeurosis of the external oblique muscle, instead of descending through the external ring; the diffused hard swelling in this case would not have suggested the existence of hernia, but for the symptoms of acute strangulation which were present. The brawny tension of phlegmon solicits the knife of the surgeon, equally with the soft yielding centre of an acute abscess. The impress which the finger leaves in œdema marks the exist-

ence of infiltration of the areolar tissue; and the crepitation of emphysema the presence of air. This latter peculiar and unmistakable sensation is also occasionally met with in the neighbourhood of abscesses, and is the result of decomposition. Crepitus, as a diagnostic sign of fracture, is generally much valued by surgeons. I am not disposed to attach so much importance to it by itself, except in experienced hands and under peculiar circumstances. I think that it is subordinate in significance to many other signs, and is often obscure, and liable to be confused with a similar sensation encountered in synovial and other effusions.

Fluctuation, or the movement of a fluid within a more or less circumscribed space, is a sign, the value of which depends more on the tact of the surgeon in detecting it than on its own intrinsic worth. My meaning is that where it is palpable and unmistakable there are usually other signs or symptoms present which point to the same conclusion; but where fluctuation is deeply seated, indistinct and, perhaps, the chief or only guide on which the surgeon has to depend, its value is greatly enhanced in the hands of a skilful manipulator. In such investigations there are many points which require care and consideration. However limited the spot where you are seeking to ascertain the presence of fluctuation, a finger of each hand should be employed, if practicable, in preference to using two fingers of the same hand: the impression thus obtained is far more satisfactory. If examining a suspected cyst, it should be fixed by an assistant whilst the palpation is conducted; and much assistance will also be afforded by making the object of examination as tense as possible, and bringing it near to the surface. If there be superjacent muscles they must be relaxed; if the accumulation of fluid be large, it should be allowed to gravitate towards one point. Yet, notwithstanding every precaution, there are many sources of fallacy associated with this diagnostic sign, which personal experience alone can teach the surgeon. Many parts of the body in a normal condition may be made to yield a sensation very like fluctuation. Subfascial serous infiltration, as in the muscles of the fore-arm, can scarcely be distinguished from the genuine sensation of a deep-seated and circumscribed cavity containing fluid.

In orchitis, a similar error, for the same reason, may occur. On the other hand, in subpectoral or perineal abscess, the obscure fluctuation may readily be overlooked. Even the wave which is conveyed across the abdomen by a light tap with the finger is by no means a certain indication that we have fluid to deal with. Twice it has occurred to me to tap an ovarian cyst where the contents were gelatinous; and a few months since I removed such a cyst, of very large size, which was entirely filled with a very tenacious jelly. Yet, in each of these cases, the wave was as distinct as—I had almost said more so than—where nothing but fluid was present. Deep-seated fat tumours, in like manner, may be mistaken for cysts containing fluid. Thus, though the experienced surgeon may, with confidence, trust to, and act upon, his own impressions, he will not infrequently pause, where a more limited practical knowledge might hurry another into an erroneous judgment and, consequently, injudicious action.

The use of the other senses, viz., of hearing, smelling, and tasting, is much more limited in surgical diagnosis. I do not mean, by this observation, that the surgeon is justified in neglecting, or should be compelled to shrink from, the use of the stethoscope: his practice will afford him ample opportunity of using it, in testing the condition of the lungs and heart, as well as in abnormal states of the arterial system. The varying condition of the intestines in mechanical obstruction is capable of being verified by percussion. The ring of an urinary calculus, when the sound is introduced, leaves nothing to be desired in obtaining the requisite information for a correct diagnosis.

The sense of smell is brought into requisition in testing the character of the excretions; and still more importantly in ascertaining the presence of a foul atmosphere in the sick chamber, which is a ripe source of many serious complications in the management of surgical operations.

Treatment is sometimes accidentally useful in the diagnosis of both injuries and surgical diseases; or it may be rendered available by carefully watching its effects. With this object in view, it should be the aim of the surgeon to remove as far as possible all adventitious circumstances which may influence the existing state of the patient; and I know of no condition more important in favouring this desideratum than rest. Especially is joint mischief, whether the result of injury or disease, thus most satisfactorily tested, where there exists doubt as to the true nature of the malady. More active measures may, of course, be resorted to, with the same object in view; but these must be used with discretion. Active treatment of any sort is rarely justifiable, where its proposed object is simply to unmask a disease: and exploratory operations should have attached to them the condition that the patient's chance of recovery will not be materially endangered by the proceeding.

[To be continued.]