

cases again there is so much swelling and bruising of the soft parts that a thorough examination and diagnosis cannot be made until after the lapse of a few days.

The lower jaw must be examined in a similar manner. The surgeon should first run his fingers along the outer and under-surface of the body of the bone to detect any irregularity or want of symmetry of the two sides. Then let him look at the line of the teeth, and if any irregularity in it be seen, let him grasp the bone, with one hand on each side of the deformity, and try whether there be mobility and crepitus, and note whether the fracture extend through the alveolar process alone or through the body of the bone as well. If the fracture be opposite or behind the canine tooth, the sensibility of the lower lip on the same side should be tested, to ascertain whether there is also injury of the inferior dental nerve. The surgeon should carefully note whether all the teeth are in place, and if not, he should make sure that one has not slipped down between the fragments. The ramus of the bone must then be carefully examined; by seizing the angle mobility can be tried for, the contour of the posterior border as well as of the surface through the masseter muscle should be determined. Should these parts be sound and yet the patient complain of great pain in opening and closing the mouth, while he can himself feel and hear crepitus, the coronoid and articular processes should be carefully examined. Place the fore-fingers, one immediately in front of each pinna, to feel the condyles in their normal position, and carefully compare them to make certain whether they are or are not symmetrical, and look closely at the position of the chin, noting whether the space between the lower central incisor teeth is vertically below that between the upper; should there be deformity of one condyle, while the chin is displaced to the same side, a fracture

of the neck of the jaw on that side is to be diagnosed. The coronoid process is to be explored by the finger in the mouth, which may detect that it is immovable, or that it is movable on the rest of the bone, and sometimes a sharp projecting edge or point of the fracture can be detected.

If, however, on placing the finger immediately in front of the tragus, the firm, slightly projecting condyle of the lower jaw is not to be detected, but, on the contrary, a hollow (the glenoid fossa) is felt, while there is a fulness of the temporal fossa just above the zygoma, there is a *dislocation of the jaw*. This may be *unilateral*, in which case the chin is displaced to the opposite side, or *bilateral*, when the mouth is open and the chin protruded, and there will be the usual signs of pain, with dribbling of saliva, and pain in speaking or attempting to swallow.

CHAPTER VIII.

THE DIAGNOSIS OF INJURIES OF THE NECK.

THE injuries of this region may be divided into wounds, contusions, the impaction of foreign bodies in the respiratory or alimentary passages, and the local effects of heat and caustics. Sprains and fracture and dislocation of the cervical spine have been considered under the head of *injuries of the spine* (chapter vi.).

Wounds of the neck, inflicted from the outside, are, of course, obvious, but they vary from the most trivial, through all grades up to those which are almost instantly fatal, and it is necessary both for purposes of prognosis and treatment, to determine what parts have been severed. The question of primary interest is that of wounds of

vessels and hæmorrhage, and the ordinary rules will here guide the surgeon; the main vessels lie so deeply that they are comparatively rarely severed. If the wound is in front above the hyoid bone, the *tongue* may be implicated. An incision in the thyro-hyoid space may sever the *epiglottis*, and so open into the *pharynx*. Wounds opposite the thyroid cartilage, and severing that structure, may traverse the larynx above, at the level of, or below the *rima glottidis*. Still lower down, the *crico-thyroid membrane*, or the *trachea*, may be implicated. A wound of the *air-passage* will be shown by the escape of air from the wound, and oftentimes also by the escape of mucus and frothy blood, and by the loss of voice. The *pharynx* is readily opened through the thyro-hyoid space; but below that, it and the gullet can only be injured by a wound on the front of the neck if it have first completely severed the larynx or trachea; where the wound is thus very deep it may in some instances be obvious that the alimentary canal is opened or severed; but where there is doubt it may be cleared up by passing a soft catheter or œsophageal tube through the mouth, and observing whether it be visible through the wound; the surgeon should not give the patient food to swallow to see if it escape through the wound in the neck, as it may pass into the air-passages, and do serious harm; and only when he is assured that the pharynx or œsophagus is not wounded should he allow the patient to eat or drink.

In cases of *gunshot wound* or *stab* in the neck, where the injured parts cannot be so well and so easily explored, the diagnosis has to be more largely inferential. If a soft, puffy, crackling swelling forms, which increases on attempts at coughing, it is evidently subcutaneous emphysema from *wound of the air-passage*; such a wound is also to be diagnosed if the patient cough up frothy blood. A *stab* or *gunshot*

wound of the œsophagus may pass unnoticed; but if the patient vomit blood, or if deglutition be very difficult or painful, and especially if on drinking some milk some of the fluid appear at the external wound, such an injury is to be diagnosed. *Injury of the nerves* of the neck will be shown by limited paralysis; in the posterior triangle the great cords of the brachial plexus may be severed, and there will then be motor and sensory paralysis of parts of the upper limb; or the phrenic nerve may be injured as it lies on the scalenus anticus, this will be shown by paralysis of the diaphragm, causing difficulty in taking a full inspiration, and inability to force down the abdominal viscera, and protrude the belly-wall fully on the same side. If, after such a wound in the neck, the pulse be found irregular and quick, and the action of the heart turbulent, it would point to injury of the vagus nerve; while if the pupil on the same side be small, and do not dilate when both eyes are shaded, it would indicate an injury of the cervical sympathetic. If there be loss of voice or dyspnoea, not otherwise explained, the larynx should be carefully examined with a laryngoscope, and if one of the cords be found in the cadaveric position, and unmoved when the patient attempts phonation, or takes a deep inspiration, paralysis of the muscles of that side of the larynx from division of the recurrent laryngeal nerve must be diagnosed.

In regard to *wounds inflicted from the inside*, it only needs to be pointed out that an exact diagnosis may be quite impossible; hæmorrhage may show that a vessel has been wounded, but there may be nothing to indicate what particular vessel is injured, especially where the wound is out of sight.

Contusions of the neck may be instantly fatal. Where this is not the case the examination should be conducted with the view of determining whether the *hyoid bone*, or any of the cartilages of the larynx or

the trachea, have been injured. The arch of the hyoid bone should first be examined to see if there is any irregularity in it, or whether on compressing the two cornua crepitus is obtained, or great pain caused, or whether the bone yields with the normal elasticity; where the bone is broken there is usually great pain in deglutition and in any movement of the tongue, so that speech is difficult and painful; there is also inability to turn the head, and on looking into the mouth ecchymosis of the mucous membrane may be observed. Dislocation of the hyoid bone, in which the cornu of the bone catches against the cornu of the thyroid cartilage, has already been described.

Next examine the *cartilages of the larynx*, and if they be found flattened, or the pomum Adami displaced to one side, or unduly movable, or there be distinct crepitus, a fracture of one or other of these cartilages may be diagnosed. There may be so much swelling from effused blood or from emphysema that no precise diagnosis may be possible. The symptoms may be nil or very severe—dyspnœa, cough, and pain.

The *trachea* is very rarely ruptured; but if after a blow on the lower part of the front of the neck there be severe dyspnœa, with cold, livid countenance, weak or lost voice, emphysema of the neck, and the larynx can be felt to be normal, this injury may be suspected, and the diagnosis will be established if the state of the patient and of the parts permit of an examination of the trachea by the finger, and a gap be found in its continuity.

CHAPTER IX.

THE DIAGNOSIS OF FOREIGN BODIES IN THE PHARYNX,
ŒSOPHAGUS, AND AIR PASSAGES.

CASES in which foreign bodies have passed from the mouth, and in some instances from the stomach, into the œsophagus or air passages often present great difficulties in diagnosis, while they are never without grave importance. They naturally divide themselves into two groups: one, in which there is a distinct history pointing to such an accident, and the other, in which no such history is forthcoming, and in which the surgeon has to trust alone to the result of his examination; these latter cases may be very obscure. The *history* that may be volunteered, or that should be inquired for, is that of a sudden inspiration or effort while food or some other substance is in the mouth or held between the lips, of vomiting, or of hurried swallowing of only partially masticated food, etc., followed immediately, even suddenly, by symptoms of obstruction to respiration, to deglutition, or to both. In young children there may be an entire absence of history, or it may be known only that the child had something in its mouth when the symptoms suddenly supervened, and if it be cherries or plums that the child was eating, the fact becomes additionally significant. In older persons the symptoms may come on during sleep, from the slipping of a plate of artificial teeth, and the surgeon in any case of sudden symptoms of obstruction should satisfy himself that this accident has not happened. In vomiting during unconsciousness from alcohol, chloroform, etc., some of the vomited matters may pass into the air passages.

In addition to these positive facts, there are some of a negative character that may be of use; these are the absence of fever, of any previous cough, of change of voice or dyspnoea, and of membranous pharyngitis; in this way croup can be excluded.

The symptoms vary within a very wide range. They may be constant or intermittent, threatening and even causing instant death, or slight and continuing for months or years. They may be enumerated as pain and difficulty in deglutition, pain and difficulty in respiration, spasmodic attacks of coughing, loss or change of voice, obstruction to the entrance of air into a part or the whole of one lung, purulent expectoration, etc. The chief characteristic is the sudden abrupt onset of the symptoms.

The diagnosis.—In cases of extreme urgency, with sudden dyspnoea threatening life, and aphonia, the surgeon will at once thrust his finger to the back of the mouth to feel for and to dislodge any body that may be over or in the upper orifice of the larynx, and failing this will proceed to open the larynx or trachea, without waiting to make an exact diagnosis of the cause and actual position of the obstruction.

In cases of less urgency, where there is time for deliberation, the first step in the diagnosis is to determine whether the foreign body be present in the air or the food passage. For this purpose give the patient some water to swallow, and if that be taken easily then try some bread, and if a bolus of bread be swallowed without difficulty or pain it may be concluded that the pharynx and œsophagus are free. If the result of the trial is inconclusive, an œsophageal bougie or probang may be passed, which will at once determine the presence or absence of obstruction in that tube.

Foreign bodies in pharynx or œsophagus.

—The usual mode of procedure is for the surgeon to

pass his right forefinger into the pharynx, and with it to explore the fauces, tonsils, upper orifice of larynx, and as far down the pharynx as he can reach; in many cases this will suffice to determine the presence and position, and even to dislodge a foreign body; but it is imperfect in result, and disagreeable to the patient. A better plan is to trust to the eye. With the mirror used for the laryngoscope throw a strong light into the pharynx, and explore it well, then introduce the laryngeal mirror, and with it examine the upper orifice of the larynx, base of tongue, and lower part of pharynx. Should the obstruction or impaction be below this, as it usually is, the œsophagoscope, an instrument which as yet has been but little used, may be passed, and the lower end of the pharynx and the œsophagus explored, or an ivory-ended probang on a whalebone stem may be slowly and gently passed down into the stomach; one of full size should be chosen. With this a foreign body of any but a small size may be felt, and if thought desirable, may be pushed on into the stomach. Pins and small fish-bones, however, will not be thus detected. For them it is best to use an "umbrella probang," by which they may be removed. If, however, after repeated trials, nothing be removed, and the patient complain of a pricking pain in a part beyond the reach of the eye or finger, it is a difficult matter to determine whether the symptoms are due to a sharp body actually impacted, or to a scratch or abrasion made by such on its way to the stomach, which often feels to the patient during swallowing like a sharp prick. Time will help most of all in clearing up the matter, for if it be an abrasion or wound of the gullet, and only soft food be taken and be carefully swallowed, the pain will gradually and quickly subside; whereas if the foreign body be still impacted, the pain will continue, and the patient may hawk up a little blood and pus. It is oftentimes a

very difficult matter for the surgeon to assure himself or the patient that some small sharp body is not really impacted in the gullet. (*See page 18.*)

When large bodies, such as a set of false teeth, are impacted in the lower part of the pharynx or upper part of the gullet, they may be plainly felt in the neck, bulging out the wall of the tube behind the larynx or trachea.

Foreign bodies in the air passages.—If the symptoms to which reference has already been made lead to the belief that there is or may be a foreign body in the air passages, the case becomes one of grave importance, demanding a most careful examination. It must be remembered that while such an accident may induce the most distressing and alarming or even quickly fatal symptoms, in other cases the symptoms may be very slight, and further, that, having been severe at first they may quickly subside and give the impression that the foreign body has been expelled: this latency of symptoms must not deceive the surgeon.

The evidence on which reliance must be placed is that which shows the actual seat of the foreign body, rather than the general symptoms of the ingress of some solid substance. The examination, whenever possible, should be systematic. *First examine the larynx*, note the voice, the character of the dyspnoea and cough, and whether there is any local pain or tenderness; but reliance must be placed chiefly on the results of a careful laryngoscopic examination, which should be as thorough and systematic as possible, the observer first exploring the ventricles and the parts above the rima glottidis, then the rima, and subsequently the parts below the cords. Should the body be very small, as, for example, a pin which has transfixed the tissues, and has become almost entirely buried in them, it may be overlooked if great caution be not exercised. In favourable cases the *trachea*

can be examined in the same way, and any foreign body in it seen; in other cases, however, we have to rely rather upon symptoms; if attacks of severe spasmodic dyspnoea recur from time to time as the result of a cough or effort, and the patient feel something moving in his trachea, and even perhaps striking the cords above, and still more if on ausculting over the front of the neck the foreign body be heard moving up and down in the trachea with respiration, we are justified in diagnosing the presence of a body which lies loosely in the trachea, and is occasionally forced up violently against the cords, exciting intense spasm of the glottis-closers. Should the trachea be found free, *the lungs* must be carefully examined, attention being directed to the expansion of the two sides respectively, and to the results of percussion and auscultation. Should one side of the chest be found immovable during respiration, while the opposite side moves excessively, and the immovable side be found to yield a resonant percussion note, the opposite side being hyper-resonant, and on ausculting the chest there be an absence of vesicular murmur over the one side, or a loud musical or sibilant râle, loudest over the root of the lung, while on the opposite side the breath sound is exaggerated, and without râle unless that on the immovable side be conducted across; if these signs are made out, there can be no hesitation in diagnosing the impaction of some foreign body in the bronchus of the side on which the chest is immovable. It should be remembered that in such cases there may be no dyspnoea or distress while the patient is quiet, but movement will at once be attended with dyspnoea. Should an absence of breath sounds or a loud sonorous or sibilant râle be detected over only a part of one lung, the symptoms may be attributed to the impaction of a foreign body in one of the secondary or tertiary

bronchial tubes. In some cases a diagnosis has only been made, and has only seemed to be possible, when the foreign body has been actually extruded, either through the mouth or through an abscess in the chest walls.

Cases where foreign bodies have lodged for some time, and have set up suppuration, will probably be overlooked unless the history of the onset of the affection be elicited; unusual localisation or exact limitation of the physical signs, however, should always suggest inquiry as to the possibility of the cause being an impacted foreign body.

There are other cases of injury from foreign bodies getting into the air passages or gullet, viz those due to hot liquids or caustics. In either case the lips, mouth, and tongue may show signs of scalding, or of the caustic effects of acids or alkalies or of carbolic acid. But in other instances the rapid onset of laryngeal obstruction in a child who has shown no previous symptoms is the first and only evidence of the *scald of the larynx*.

CHAPTER X.

THE DIAGNOSIS OF INJURIES OF THE CHEST.

INJURIES of the chest are of very frequent occurrence, and from the great importance of the contained viscera they are of special practical interest. They may be classified into *contusions* and *wounds*, which will be separately considered; and as the sequelæ of these two groups of injuries are to some extent the same, only the immediate and direct effects of contusions and wounds will be considered at first, and in a concluding section of the chapter, the diagnosis of

all the sequelæ or secondary complications of chest injuries will be given. Many of these latter are inflammatory affections, which, when idiopathic, come under the care of physicians, and much fuller information concerning them will be found in works on medicine.

A. Contusions.—A patient having received a contusion of the chest, the diagnosis may be best arrived at by the surgeon's attempting to answer the following five questions:

(1) **Is there a bruise?**—The presence or absence of the well-known ecchymotic discoloration will decide this point. If a purple or yellowish stain appear in the skin after an interval of a few days, it indicates a deep bruise; ecchymosis and blood-staining of the skin or loin appearing after two or more days have been said to be pathognomonic of hæmothorax, but reliance must not be placed on this sign, as blood in the pleural cavity does not always cause ecchymosis in the loins. The extent of the bruise is, of course, an indication of the number and size of the vessels which have been torn, or of hæmophilia.

(2) **Is there rupture of a muscle?**—From a blow or sudden severe strain there may be more or less extensive rupture of a chest muscle, especially of the pectoralis major. If there be inability to raise the arm in front of the body, while on the patient's making the attempt to do this a gap is seen or felt in the pectoral muscle, this lesion is to be at once diagnosed. Similarly, a gap in any other muscle, with pain, and inability to contract the muscle effectively, may enable the diagnosis of ruptures of other muscles to be made.

If contraction of a muscle cause acute pain, and no fracture be present, and pressure on the painful part elicit tenderness, *bruise of the muscle*, with slight rupture, is the probable lesion. The pain of