Cases of tracheotomy in croup and for the removal of foreign bodies / by James Spence.

CASES

OF

TRACHEOTOMY IN CROUP,

AND FOR

THE REMOVAL OF FOREIGN BODIES.

BY

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CASES

OF

TRACHEOTOMY IN CROUP.[1]

I HAVE arranged the cases of tracheotomy detailed in this communication under three heads. 1*st*, Cases in which the operation was performed in croup; 2*d*, For laryngitis in adults; and 3*d*, For the removal of foreign bodies from the air-passages.

In regard to the cases in which it was performed for the laryngitis of adults, or for the removal of foreign bodies, the value of the operation is so generally recognised, and the conditions which indicate its necessity so determined by the profession, that I have only selected a few cases, the peculiarities of which seemed to render them worthy of notice.

As regards the use of tracheotomy in croup, there is much difference of opinion. The general voice of the profession in this country has hitherto been unfavourable to it, whilst the success which has attended the operation on the Continent seems to have been very encouraging. This has led me of late to perform it in some cases; and I have detailed these fully, so that they may contribute to assist others in forming a judgment of the propriety of the operation in similar cases.

CASES OF CROUP.

CASE I.—John Blakeley, aged 4½ years, was seized with hoarseness and pain in the throat on the 5th of April 1856. As he did not seem very seriously ill, he was allowed to play out of doors as usual; but on the 7th the symptoms increased so much in severity, and were so evidently those of croup, that his mother applied for medical aid at the dispensary. He was accordingly seen on the evening of the 7th by Dr Glen, then one of my dispensary pupils, and was ordered a warm bath and some medicine.

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[1] Read before the Medico-Chirurgical Society.

Next morning, when Dr Glen saw him, he desired the mother to ask me to visit the child.

On going to the house, I found the patient in great agony from dyspnœa. As there was no great amount of bronchitis present, and evidently no time to be lost, I caused the child to be brought to the hospital, which was in the immediate neighbourhood, and at once performed tracheotomy. Some mucus and shreds of lymph were expelled on introducing the tube; the breathing then became easy, the lividity of the face passed away, and the little patient seemed quite relieved.

He continued to progress favourably, and on the evening of the third day the tube was removed, but had soon to be replaced on account of threatened asphyxia. It was finally removed on the sixth day, after which the wound gradually healed, and the child was dismissed cured on the 28th of May. He has continued to enjoy excellent health ever since, with the exception of showing a susceptibility to hoarseness during damp weather.

For the notes of the following case, I am indebted to my friend Dr Wilson, and I give the report in his own words:—

Case II.—"C. W., aged 3½, was first seen by me on the 19th of September, on the second or third day of an attack of scarlatina. From my first seeing him, the case presented a very bad aspect; the throat was considerably affected, and then a troublesome diarrhœa set in, accompanied by typhoid symptoms, for which he had very large quantities of wine, gradually increasing to 10 or 12 ounces a-day, chlorate of potash, astringents, etc., which were evidently beneficial; and I was in hopes he was going to struggle through, when, at the end of the third week of the disease, he was seized with symptoms of laryngitis.

"These increased, and the case seemed hopeless if left to itself; but the disease being apparently confined to the upper part of the larynx, the propriety of operative interference suggested itself to me, and I determined to ask you to see him. This you most kindly did, accompanied by Dr Watson, on the 10th of October.

"The child was much emaciated, and the pulse feeble; still, as the disease appeared to be confined to the upper part of the larynx, you resolved to give him the chance, though small, of the operation. Immediately after the operation the breathing became quite easy, and continued so till death, except on two occasions when attempts were made to dispense with the tube, and the nurse was unable to introduce it on a paroxysm of dyspnœa ensuing, although the patient had been breathing easily during the time your assistant remained. He continued to take both wine and beef-tea in large quantities, and by injection; but the stomach began to fail, the pulse became feeble, emaciation progressed, and he died on October 15th, five days after the operation.

"On reviewing the case at this distance of time, I have no hesitation in saying that the operation, though unsuccessful, was most beneficial, even allowing that it did not prolong life, which, however, I am inclined to think it did; still the relief afforded was so great, that I would be inclined (however reluctant we must be to advise operations not likely to be successful), were a precisely similar case occurring to me, to recommend the performance of tracheotomy."

Case III.—William Lindsay, aged 4 years, was seized with hoarse cough, sore throat, and occasional difficulty of breathing, on the 15th of October 1856. No treatment was resorted to till the 16th, when the symptoms became more severe, and Dr Menzies was called to see him. He was then labouring under symptoms of croup; the stridulous breathing and paroxysms of dyspnœa occurring, however, at lengthened intervals. His pulse was very rapid and small. Leeches were applied over the neck, followed by a blister, and antimonial solution was ordered to be given at stated intervals.

On Sunday the 17th Dr M. found the little patient so much worse that he

requested me to see him, in case I might think it advisable to perform tracheotomy.

I found him suffering from very urgent dyspnœa, with prolonged stridulous inspiration and very short expiration. The expansion of the thorax was deficient, the ribs being drawn inwards during respiration. The pulse was small, and the face livid. There was some slight bronchitis, but not to such an extent as to forbid the operation, which was accordingly performed, and a double tube introduced. A quantity of mucus was expelled on opening the trachea, and then the breathing became easy. A piece of muslin was placed over the orifice of the tube, and the attendants were shown how to clear it from time to time.

In the afternoon, when I saw him, I found him much relieved. The colour of the face was natural; the pulse, though still quick, was softer, fuller, and less rapid than in the morning; the breathing was quite easy.

I removed the inner tube, cleaned it, oiled it slightly, showed the attendant how to remove and clean it, and made her take it out and replace it, to make sure that she understood me.

Next morning I found him still improving, and breathing so easily, that, after cleaning the tube, I did not think it necessary to visit him again that day.

On Tuesday the 19th, when I called on Dr Menzies to accompany me to see the patient, I learned, to my great surprise, that he had died at 3 A.M. Dr M. informed me that he had seen him after my visit, and found him still doing well, and breathing quite easily. About 1 P.M., however, owing to some mucus obstructing the tube, a fit of dyspnœa came on. The nurse, instead of withdrawing the inner tube, although she had been taught how to do it, became alarmed, and it was only when the child was nearly suffocated that his father, in desperation, took it out. This at once relieved the breathing; but the effects of long-obstructed respiration soon showed themselves in pain in the head, dilated pupils, and other symptoms of cerebral effusion. The poor child soon became comatose, and died thirty-nine hours after the operation.

CASE IV.—George Stark, aged 5 years, admitted to the Infirmary on the 18th of March 1857.

The patient has been subject to cough for the last two years, and is liable to occasional acute aggravations of it. He was seized with one of these attacks about a fortnight ago, and was considerably worse than usual. His symptoms became gradually more urgent, and he was brought to the hospital on the 18th of March, suffering from a severe attack of true croup. The usual treatment, including repeated counter-irritation, was used in vain, and on the 19th he was so ill that tracheotomy seemed to afford the only chance for life. The breathing was noisy and laborious, the respirations being 30 per minute; the expansion of the chest in inspiration was very imperfect, and there was marked depression of the lower ribs in expiration. The operation was accordingly performed in the usual way, and a double tube introduced. Great relief to the breathing immediately followed the operation.

20*th*.—Pulse 140; skin hot; but patient breathing much more easily. The tube is carefully kept clear. Since the operation, considerable pain and tenderness have been felt below the left jaw.

22*d*.—Pulse 120, and skin cooler. The tenderness below the jaw has disappeared. Breathing very easy. The tube was taken out to-day, and did not require to be replaced.

25*th*.—Pulse 120, rather small; ordered ℥ij wine. The tube required to be replaced, as the breathing was becoming impeded from the closing of the wound.

26*th*.—Tube finally removed to-day; doing well.

30*th*.—Pulse 100; breathing easy; general health very much improved.

April 6*th*.—Pulse 100, full and soft; general appearance much improved; and the tracheotomy wound is closing rapidly. The raw surface left after the repeated blistering is still sloughy and irritable.

10*th*.—Going on very well; wound nearly closed, and blistered surface healing.

20*th*.—Continues to improve.

29*th*.—Dismissed cured.

Case V.—Margaret Kerr, 2½ years of age; was admitted into the Royal Infirmary on the 5th September 1857.

The patient was seized with symptoms of croup on the evening of September 2d, but was not alarmingly ill until the afternoon of the 4th, when medical advice was obtained.

In spite of the treatment adopted, warm bath, leeching, and blistering, the little patient got rapidly worse, and was brought to the Infirmary by Dr Gordon in an extremely exhausted and almost moribund condition at mid-day of the 5th inst.

Tracheotomy was performed by Mr Spence without delay. There was no trouble from hæmorrhage; some shreds of lymph and a small quantity of mucus tinged with blood escaped at the moment of opening the trachea. A double tube was introduced, and secured behind the neck in the usual way.

The operation was followed by immediate relief to the breathing; but the extreme prostration, the lividity of the countenance, and the smallness of the pulse, passed off but slowly.

She was immediately put to bed in a warm room, hot bottles placed around her, and wine freely given. Under the use of these means, she gradually revived; the face regained its natural colour, and the pulse became stronger.

For the first few hours after the operation she was constantly watched by a dresser, the tube kept clear with a feather, and the inner tube frequently removed to be more effectually cleaned. The nurse, and the mother of the child, were also taught how to do this.

Sept. 6*th*.—The tube has been constantly kept clear, and the breathing has been quiet and easy during the night except from slight occasional attacks of dyspnœa from the imperfect expectoration through the tube. To-day the pulse is good, skin moist, and colour natural. The wine, which has been given in small quantities during the night, is to be discontinued.

7*th*.—Progressing very favourably; pulse full and rapid; skin dry. Bowels opened to-day spontaneously. Ordered small doses of ipecacuan wine to be frequently repeated; also a sinapism between the shoulders.

8*th*.—Going on very well. The tube was removed to-day; but it was necessary soon to replace it, as great dyspnœa followed any obstruction of the tracheal wound.

9*th*.—Tube removed to-day, and not replaced. She is breathing almost entirely by the natural air-passages.

12*th*.—Progressing very favourably; wound closing.

16*th*.—Report as at last entry.

26*th*.—Just recovering from a smart attack of dysenteric diarrhœa; wound almost healed; breathing calm and natural.

Remarks.

All these cases of croup present some symptoms in common, viz., dyspnœa, lividity of the countenance, deficient expansion and drawing in of the thoracic parietes during respiration, and marked stridulous breathing; together with paroxysmal exacerbations of the dyspnœa, gradually increasing in frequency and intensity. In none of them was there any great amount of bronchial affection; and, with the exception of the boy Blakeley and the girl Kerr, where some small shreds of lymph were expelled after opening the trachea, in none of them did the croupous exudation seem to have taken

place to any great extent on the tracheal mucous surface, although the tenderness over the trachea prior to the operation, and the appearance of the lining membrane, as seen on opening the tube, proved that it was to some extent implicated. In these cases, therefore, the diseased condition may, for all practical purposes, be considered as confined to the larynx at the time when the urgent symptoms arose; and hence they all were in that respect favourable for giving the patients the benefit of the operation. In all, however, there was unmistakeable evidence of bronchitis and bronchial effusion occurring subsequently from extension of the inflammation, most probably increased by the operation and necessary presence of the tube. Indeed, from what I have seen of cases of tracheotomy, even for the removal of foreign bodies, where of course no bronchitis existed prior to the operation, I have little hesitation in saying that bronchitis or broncho-pneumonia almost invariably occur after it. I draw attention to this because bronchial effusion forms a most serious complication in very young children after tracheotomy, and is indeed one of the great objections to the operation in cases of croup. When present to any extent, it has generally been held, in this country at least, to contra-indicate tracheotomy, and, I think, with good reason. In children under three or four years of age, from the small size of the tube we can introduce, it is apt to become choked with the tenacious mucus, as happened in one of the cases narrated; and as, of course, we cannot make the infant understand how to cause forcible expulsion of the mucus, from time to time, by placing the fingers so as to diminish the orifice of the tube, or of the wound, as we can in older children or adults, such a case is entirely dependent on the care and experience of the attendant or nurse in the after treatment; and the danger of extensive bronchitis in a child of that age, even apart from other complications, is too well known to need to be insisted on. In no operation, perhaps, do the chances of success depend more on the care and watching of the patient by experienced attendants than in tracheotomy. In looking back on the cases detailed, I cannot but think that, had the patient Lindsay been in the hospital, the result would probably have been as successful as the cases of Blakeley and Stark; certainly his state at the time of the operation was fully as favourable, and when I last saw him alive, he was progressing well. Indeed, the history of his case shows pretty clearly that the paroxysm of dyspnœa, owing to the obstructed tube, led to fatal cerebral congestion and effusion. In all cases, it is obviously desirable to remove the tube early; but the foregoing cases, as well as other cases of tracheotomy, have shown me that we can never venture to do so without being prepared to replace it at any moment on account of some paroxysm of obstructed respiration; and this implies the necessity of having proper assistance at hand, a condition not easily attained in private practice.

The presence of any extensive exudation of false membrane must always be a formidable objection to tracheotomy. If partially loose,

it may be so placed as to act as a valvular obstruction at the lower aperture of the tracheotomy-tube; and if the membrane exist in the complete tubular form, as in that state it is often but loosely attached, it may collapse, on the trachea being opened, and cause immediate suffocation. If I am correct in holding the opinion that bronchitis or croupous exudation, when present to any extent, form objections to tracheotomy, it must be evident that very few of the cases which we see in young children admit of its performance with reasonable chance of success, except at a much earlier period of the disease than is generally thought proper to consider of its propriety in this country. In estimating the success of the operation for croup in France by M. Trousseau and other surgeons, we must keep in mind, not merely the comparatively great success of what has proved by no means so successful an operation in this country, but, taking into account the early stage in which it has often been performed there, we must ask ourselves whether many of the cases might not have recovered under active treatment without such a hazardous operation. In very young children, under three years of age, besides other dangers incident to the operation at that period, the bronchitis, which follows the operation, must render the chance of success very small indeed, and the unfortunate results of such cases often prevent the surgeon being permitted to perform tracheotomy in cases proper for it. As to the question of the propriety of the operation in cases such as that of the child Walker, where the laryngitis supervenes during scarlatina, even though the operation, as in his case, may effect all the benefit we could expect in relieving the dyspnœa, the state of the patient in other respects hardly affords much hope of recovery, and we can only regard the operation as a palliative. Viewed merely in that light, however, I think few who have seen a patient struggling in agony for breath would not feel satisfied even with the temporary relief afforded by the operation in that case; besides this further consideration, that without it, there was no chance for life being prolonged even a few hours.

The case of the child Margaret Kerr, it will be noticed, stands as it were in opposition to some of the opinions I have expressed as to the performance of tracheotomy for croup in very young children, and in the advanced stage of the disease; for this infant, only $2\frac{1}{2}$ years of age, was almost moribund when I operated. But whilst such a case, to a certain extent, may modify the remarks formerly made, and affords encouragement to attempt relief even in very unfavourable circumstances, and with the further warrant of its being the only chance for life, yet we must not be carried away, by the result of an exceptional case, to expect anything like general success in similar cases; and when we operate under such circumstances, the grounds on which we proceed should be clearly stated to the friends; and, from what I have said formerly, the surgeon must expect to meet with cases in which the child may die during the operation, or immediately on the trachea being opened.

CASES OF CHRONIC LARYNGITIS.

Case I.—On the 2d of February 1856, I was sent for by Dr Ziegler to perform tracheotomy on Mr R., who had suffered for some years from chronic laryngitis. On my way to the patient's house, I learned from Dr W. Ziegler, that Mr R. had laboured under a chronic laryngeal affection for several years, apparently complicated with pulmonary disease; that a day or two previously, while walking, he had fallen down in what was supposed to be a fit, but had recovered under the use of an antispasmodic, prescribed by a medical man who then saw him. The difficulty of breathing, however, returned, and Dr Ziegler was sent for, who found the symptoms so urgent, that he recommended tracheotomy.

I found the patient in a comatose condition, with livid countenance, cold surface, and stridulous breathing. We laid him on the sofa, and I at once proceeded to operate. As the patient lay quite unconscious, the operation was readily accomplished, and a large-sized tube introduced; but it was only after continuing artificial respiration for several minutes, sprinkling cold water on the face, etc., that the pulse could be felt at the wrist, or that the patient gave any signs of consciousness. When able to swallow, a little wine was given him, after which he rallied very rapidly, coughed up some mucus, and breathed freely by the tube.

He continued to go on favourably for some days, took nourishment, breathed easily, and expressed himself as feeling well.

On the fifth day after the operation the nurse sent for me, as, she said, there was bleeding from the wound, and through the tube. I found the shirt stained with dark blood, the quantity lost probably amounting to an ounce. As there had been some ulceration round the edge of the tube, I thought it must proceed from some small vein, but could detect no bleeding point.

Next day I found there had been no more bleeding, and he was apparently going on favourably. I took out the tube, and found the wound looking well, the opening in the trachea quite patent, and its edges rounded. Having cleaned the tube, I was struck, when proceeding to replace it, by the contorted and livid appearance of the patient's face, and perceived that he was scarcely breathing. I at once introduced the tube, stimulated the trachea with a feather, and used artificial respiration; by a little perseverance the breathing became free, and consciousness returned, but there remained complete hemiplegia of the right half of the body, and the loss of power continued for some time. During the night there was some more bleeding through the tube, and some slight venous bleeding from the wound, after coughing, but to no great amount.

Next morning I found he could move the right hand and leg, but was looking much depressed; the pulse was quick and irregular, the respiration hurried, and he had pain on the right side of the chest. Towards the afternoon he became worse, gradually sank, and died on the eighth day after the operation.

On opening the body, we found a small cavity at the upper part of the right lung containing blood, evidently the source of part of the hæmorrhage through the tube.

The larynx was much contracted, and there was great thickening of the mucous membrane.

Case II.—Ann Cuthbert, æt. 46, was admitted into the Royal Infirmary on the 6th of March 1857. She stated that about two months before admission she was seized with shivering, headache and other feverish symptoms, and that these were soon followed by pain in the throat, tenderness on pressure, and loss of speech.

At the time of her admission the breathing was very laborious, the respirations long and whistling, and the face swollen and livid; the neck was very

much swollen. A blister was ordered to be applied over the upper part of the chest, but not to extend to the throat.

March 7.—A consultation was held to-day as to the propriety of tracheotomy. All were in favour of immediate operation, and it was accordingly done without delay.

8.—Pulse small and irregular, but not very frequent; breathing quiet. The tube is cleared of mucus by a feather; the quantity of mucus is small.

9.—Breathing quite steady and regular; the engorgement of the face and neck is quite gone. Pulse rising in strength.

11.—The tube was removed to-day for the first time, cleaned, and replaced. Doing well.

14.—Breathing very easy; pulse weak, but slowly rising in strength. The tube moves apparently synchronously with the pulsations of the innominate artery.

18.—Patient looking very much better; no lividity of the countenance; breathing quite easy. The pulse is still small; but this seems to be its natural condition, for the pulse in the brachial and posterior tibial arteries is also very small.

22.—A new double tube, having an opening in its convexity to enable the patient to use the voice, was introduced to-day. Doing well.

April 1.—Patient's appearance and general health much improved. The pulse still continues small; as nothing abnormal can be found in the chest to explain it, this must be its natural condition.

16.—Patient going on well. The pulse still unnaturally small. The voice is loud and distinct when she closes the opening of the tube with her finger.

20.—Dismissed cured.

Remarks.

The case of Mr R. is remarkable for the intensity of the suffocative paroxysms, life being all but extinct at the time I opened the trachea; and the immediate effect of the operation was highly satisfactory.

But the peculiarity in this case most deserving of notice, is the attack of hemiplegia of the right side, occurring whilst the tube was out of the trachea for a few minutes. Was this dependent on obstructed respiration affecting the cerebral circulation, or did it arise from some temporary cerebral excitement? The coincidence of the withdrawal of the tube and the accession of the hemiplegia, together with the fact that no organic lesion of the brain, beyond a little effusion, was found, would lead us to suppose it was the former cause which produced it; but then the opening of the trachea was free, its edges were rounded off and adherent to the surrounding parts, and the patient had expelled some mucus on the withdrawal of the tube. There was, therefore, no apparent cause of obstruction to respiration; and, moreover, there was no noisy breathing nor struggle on the part of the patient, for I was standing close to his bed, and must have heard and noticed it; so that, except for the relief afforded by the replacement of the tube, I would rather incline to the belief, that the seizure was referable to some temporary condition of the cerebral circulation in a man of great nervous susceptibility.

The case of Ann Cuthbert was a well-marked case of progressive chronic laryngitis, with stridor on inspiration, great aphonia, lividity of the surface, and paroxysms of dyspnœa, which were becoming both more severe and more frequent, especially at night. It exem

plifies well the benefit of the operation when performed before these conditions have existed so long as to lead to exhaustion of the patient, to the unfavourable state induced by the long continued imperfect aeration of the blood, or to disease of the bronchi or substance of the lung. The state of this woman's pulse was most peculiar; it was small, weak, and irregular in all the arteries, just as in a moribund patient, and gave me a most unfavourable opinion of her state for the first few days, though in all other respects she was quite well.

I have seen the patient several times since she left the Infirmary, and the pulse, although quite regular, is still of the same small feeble character. This suggested the existence of some deep-seated aneurism; but there was no evidence of any such affection afforded by physical signs.

TRACHEOTOMY FOR REMOVAL OF FOREIGN BODIES.

Case I.—On the morning of Thursday the 23d of September 1841, I was sent for in great haste to see a child, who, according to the statement of the messenger, "was suffocating from something sticking in the throat." On reaching the house, which was situated in the immediate vicinity, I found the patient, a boy about the age of four years at most, asphyxiating; his face was much swollen and livid, the eyes were protruding, and the veins of the neck turgid, with the nostrils dilated. The respirations were prolonged, and accompanied with a peculiar stridulous noise. The mother of the child told me, that, on the previous evening, having to go from home, she left the child in care of another woman, and that she had, before going away, given the child some small plums, while eating which, he was observed to cough violently, and roll himself on the ground; and on recovering from this state, he mentioned that he had swallowed one of the plum stones, but as no further symptoms occurred at that time, no notice was taken of it. He continued quite well, and slept as usual during the night, and took his breakfast the following morning; but shortly before I saw him, and whilst playing about the room with the other children, he, on a sudden, cried out that he felt the stone in his throat, and almost instantly fell down in the state of suffocation which I have already described. Although I had no doubt whatever as to the foreign body being in the windpipe, yet, to make assurance doubly sure, I passed a probang down the œsophagus. This met with no obstacle in its passage, and, as I expected, afforded no relief. As the symptoms therefore were most urgent, the extremities becoming cold, and the pulse intermitting, I stated to Mr Lawrie, surgeon, who was present, that I considered the operation of tracheotomy as the only chance of saving the child. Mr Lawrie concurring in this opinion, I performed the operation, which was accomplished without greater difficulty or delay than what might be expected from the want of assistants and the struggling of the child. On the trachea being opened, a quantity of frothy mucus was forcibly ejected, but no foreign body; through the opening, however, the child breathed freely, and the face soon resumed its natural appearance. After waiting a few moments, I passed a slightly bent probe upwards into the larynx, and downwards into the bronchi, but could not detect any foreign body. I therefore introduced a small trachea tube, and left the child in charge of my friend, Dr Smith, until I could procure instruments for extraction. At 11 A.M., I again saw the child, along with Professor Syme, who kindly attended at my request. The child then breathed easily through the tube; but when it was removed, and the opening closed, there was great difficulty in respiration.

The edges of the opening being held aside by small hooks, I again carefully

examined both the larynx and bronchi with a probe, but most particularly the larynx, for all the symptoms tended to impress us with the belief that the foreign body was there. Mr Syme also examined the parts, but could not detect it. It was agreed in consultation that it was best to enlarge the opening; I therefore divided the cricoid cartilage so as to allow a more ready examination of the larynx, and a more easy escape of the foreign body; but we were still unsuccessful. Under these circumstances, we deemed it best to replace the tube until the following day. Nothing particular occurred during the remainder of the day ; the child was carefully attended to, he continued to breathe freely through the tube, and both sides of the chest seemed to expand equally, and at the same moment. He was ordered a little milk with warm water and sugar, for food, which he partook of readily, and slept at intervals. On Friday Professor Syme again saw him with me; the tube was withdrawn, but the difficult respiration again returned when the opening was closed; whilst, on the contrary, the breathing was free, and perfectly easy when it was left open. We again carefully examined the larynx and bronchi, but in vain. We could not detect any foreign body; and we concluded that it had probably been pushed up by the probe passed into the pharynx and swallowed, and that the difficulty in breathing might be owing to swelling of the mucous membrane lining the larynx. The tube was once more replaced, and the same treatment adopted as before ; a gentle laxative was prescribed, and I desired the stools to be carefully examined. I again saw him at 3 P.M., when I found his breathing was hurried, together with a considerable degree of general fever ; the face was flushed, and the pulse rather quick and hard ; I therefore ordered some leeches to be applied over the region of the chest, the laxative medicine to be repeated, and an injection to be given in case it did not soon operate.

I again saw him at 8 P.M. ; he now seemed considerably easier, there was less fever and restlessness, and the breathing was less hurried ; the bowels had been freely opened, and the leeches had bled well. At 10 o'clock I was informed he was rather worse; and, on visiting him, I found him very restless, his breathing had become hurried, and he was thirsty and hot. Having cleaned the tube, it relieved his breathing; and I left him, and sent a person to remain with him during the night, with strict instructions to call me if he became worse. At half-past 11 o'clock, I was again sent for, as the child had become suddenly much worse. I now found him fast sinking. I introduced a clean tube, and ordered him some wine and water, under which he rallied in a measure ; but it was only for a short period, as about midnight he expired.

Having obtained permission from the friends to examine the body, I did so on the morning of the 26th September, and the following were the appearances found on dissection :—

Post-mortem Examination of the Body.

I carefully examined the larynx and trachea, but could find no foreign body. There was a slight degree of vascularity of the mucous membrane of the larynx, together with some thick mucus in its cavity, but there was very little swelling of the parts.

I laid open the right bronchial tube, which presented nearly its natural appearance, with but slight degree of vascularity of its mucous coating, but there was no foreign body in it. The right lung, with the exception of a little congestion at its posterior part, was of a healthy appearance, and crepitated naturally on being pressed between the fingers. The left bronchus was next examined ; and as I saw no foreign body, I was about to give up all further investigation of the thoracic viscera, concluding that it had been pushed upwards during our examination of the larynx, as I previously conjectured, and that it passed into the stomach, when my attention was arrested by the peculiarly dark appearance of the lower portion of the upper lobe of the left lung ; and on cutting into this portion, I found the foreign body, a small damson stone, impacted into one of the large subdivisions of the left bronchus, the larger end of the stone projecting upwards. No other parts were therefore examined.

Remarks.

In reflecting on the case which I have just detailed, some phenomena of a very unusual kind present themselves. In the first place, when we regard the history of the case given by the child's mother, the sudden manner of the attack, together with the urgent symptoms of asphyxia when first seen, and the almost immediate relief afforded by opening the trachea, although no foreign body was expelled; and if we add to this, that while the child breathed freely through the tube, both sides of the chest seemed to expand equally, and at the same moment; but that, on the other hand, whenever the tube was removed, and the opening in the trachea closed, difficult respiration ensued,—I think few medical men would hesitate to pronounce as their opinion, that the foreign body was entangled in the larynx; and yet the case just narrated affords an example of all these symptoms being present, whilst the foreign body was impacted in one of the ramifications of the bronchus. It may indeed be urged, and I confess I cannot quite divest myself of the idea, that the foreign body was in the larynx when the child was first seen, and had thus given rise to the very urgent symptoms which led me to operate; and that, owing to the struggles of the child during the operation, it had been dislodged from the larynx, and passed into the bronchus. Still, allowing this supposition to be true, it leaves unexplained the cause of difficult respiration which constantly ensued on withdrawing the tube, and closing the opening in the trachea. This is perhaps the most peculiar feature of the case; and I can only attribute it to the irritation caused by the presence of the foreign body being conveyed along the nerves distributed on the mucous lining of the bronchus and trachea, towards the larynx, and so exciting spasmodic action of the muscles which close the glottis.

Last, but not least in point of practical interest, is the unusual situation of the foreign body in this case; for, so far as I am aware, there is no case recorded in which a large-sized foreign body has found its way into the left bronchus. Indeed, most writers on the subject speak of the foreign body passing down into the right bronchus, as if it were a constant rule.

As regards the extraction of a foreign body, if discovered under similar circumstances, I should think it, to say the least, exceedingly difficult; for in a child at that age, the trachea and bronchi are so small, as to afford but little room for the use of forceps, or other extracting instruments. I believe, that the only chance in this case of extracting the foreign body, would have been (had its situation been discovered) to have loosened the foreign body from its position in the orifice of the bronchial ramification, by means of the flat end of a long probe, so as to allow the air to pass into the portion of lung beyond it, when it would probably have been expelled during expiration. For, of course, whilst it remained impacted in the bronchial ramification, it must have caused complete occlusion of that portion of lung to which that division of the left bronchus was distributed.

Case II.—A fine little girl, four years of age, the daughter of a medical man in the country, was eating damson jam, when one of the stones, which she had been sucking, suddenly slipped into the larynx. A violent paroxysm of cough and dyspnœa, threatening suffocation, immediately ensued; but the foreign body passing downwards, temporary relief was obtained. As similar paroxysms recurred, the father telegraphed to town for Professor Goodsir and myself to come out immediately.

When we arrived, we found that she had had some severe paroxysms, and that the means used by her father, and Dr Baird of Linlithgow, who had also seen her, had failed to cause ejection of the foreign body.

Under these circumstances, and as the movement of the body in the trachea during respiration could be distinctly heard, we at once proposed tracheotomy, which indeed was the object of our being sent for, and therefore there was no delay.

The use of chloroform was tried at the request of the friends; but it excited such a tendency to suffocation that it was given up, and I proceeded to operate at once. Owing to the bulk of the thymus gland, the numerous dilated veins, and the presence of the middle thyroid artery, the operation required some care, but the parts were so distinctly seen that it was not prolonged.

I made a long incision in the trachea, and inserted the points of my dissecting forceps at the upper part, expanding their blades to keep the orifice patent; on doing this, and raising the head, a quantity of mucus was ejected,—then the plum-stone was seen to be forced towards the opening; but, unfortunately, at this moment inspiration took place, and the rush of entering air carried it back.

We attempted to cause its expulsion by inducing coughing, and by shaking, and altering the position, of the little patient, but in vain. On examining the chest, it at once became evident that the stone had become impacted; for while the right side expanded on inspiration, the left was flattened and immoveable, the lower ribs being drawn forcibly inwards, and the respiratory murmur entirely absent.

By means of flattened probes passed along the left bronchus, we attempted to reach the stone for the purpose of dislodging it; and we tried to procure its expulsion by moving the thoracic parietes, and by every means we could think of, but without success.

In consultation, it was determined to take the child to town with us next morning, and try if any plan could be devised to loosen it by instruments or by suction.

Having brought the patient to Edinburgh, a great variety of means were tried, but with no better result; and, after a few days' illness, the child died.

On examination after death, the damson-stone was found impacted in the left bronchus, fairly filling it up like a cork, and preventing all entrance of air into the left lung, which was flaccid and collapsed (*See Plate, Fig.* 1); the thoracic parietes of the left side, as seen during life, were contracted and flattened. The child, at the time of the accident, was just convalescing from a severe attack of pneumonia of the right lung, the lower part of which had suffered so as to be hepatised, while the upper part was engorged with bloody serum, and the bronchi loaded with mucus; so that the child died more rapidly than would have been the case had the right lung been healthy.

Remarks. The foregoing case presents several points of interest. 1*st*, The direction in which the foreign body was carried; 2*d*, Its impaction at the termination of the left bronchus, and the complete occlusion of the tube and collapse of the lung thereby occasioned; and 3*d*, The question as to what means can be suggested for the treatment of similar cases.

In regard to the first of these points, it is very generally stated that foreign bodies entering the air-passages pass into the right

bronchus; this and the preceding case, however, show that there is nothing to prevent a foreign body passing down the left bronchus.

As to the second, in the case just narrated the plum-stone was much larger than in the former case, and was so placed as completely to prevent any air from entering the left lung, and hence to preclude any chance of its being forced out by an effort at expiration; the marked flattening and other symptoms leaving no doubt as to its position, or as to the collapse of the corresponding lung.

Third, as to the treatment. I have always regretted that chloroform should have been given in this case; for I think that the condition it induced, rendered the expulsive efforts less forcible than they usually are in such cases. The appearance of the foreign body was so momentary, that there was no time to seize it, even if we had not expected that it would be forcibly expelled. The manner in which it was carried back into the bronchus, and the evidently complete occlusion of air from the left lung, rendered all chance of its expulsion hopeless; and therefore no time was lost in trying, by the means already mentioned, to loosen it from its position, so much at least as to admit air along its side into the lung beyond, and so favour its expulsion. This was principally attempted by the use of flattened probes; but we felt, at the same time, the risk of impacting the stone more firmly, and therefore great care was taken to keep the flattened probe close to the sides of the tube in passing it. As I have said, neither this, nor inverting and shaking the patient, produced any effect. In the subsequent attempts, the application of some suction power, applied through a tube passed down the bronchus, was suggested; but, in consultation, it was agreed that the irritation to the passages by these manipulations would be productive of more harm and risk than its chance of success could compensate for, and that by leaving the child quiet for a time, the body might become loosened by the changes induced by its own presence. Unfortunately, however, the state of the right lung precluded the chance of the success of this plan, which, under ordinary circumstances, I believe, would be the wisest to adopt.

As to other methods, in my remarks on Case I., I have stated my opinion that, even if we were sure of the position of the foreign body, the small size of the passages renders the introduction of extracting instruments impossible, and that, unaided by the natural expulsive efforts, artificial means would be very inefficient; and I regret that my experience in this second case does not enable me to alter my opinion.

Case III.—Madeleine H. was admitted into the Royal Infirmary on the 29th of June 1857.

About three hours before admission, while she was playing with a plum-stone and a cherry-stone in her mouth, they both suddenly slipped down her throat; this was followed by a convulsive fit of coughing, and she was found by her mother lying on the ground, in a paroxysm of dyspnœa; the plum-stone was lying beside her, but the cherry-stone could not be found. I saw her at her house; but as the urgent symptoms had disappeared, and there

seemed some doubt as to the history of the case, I sent her to the Infirmary to be carefully watched.

On admission, she had an occasional slight laryngeal cough, pain on pressure over the larynx, and an apparently altered tone of voice ; but no difficulty or noise in breathing, and no sign of the presence of a foreign body could be detected by the stethoscope.

During the night she was constantly watched, in case of asphyxia occurring suddenly. She slept quietly during most of the night, but towards morning had several very alarming attacks of dyspnœa, so much so, that tracheotomy was twice about to be performed.

Next day she was much in the same condition ; and, after consultation, tracheotomy was decided upon, and forthwith performed. After the first incision was made, a severe fit of coughing came on, and the dyspnœa was so great that the operation was rapidly concluded, on account of threatened asphyxia. As soon as the windpipe was opened and the edges of the incision separated, the foreign body was forcibly ejected by a violent expiration, and the breathing immediately became perfectly calm. A tube was introduced, but removed after three hours, the breathing being quite easy, and chiefly by the natural air-passages after its removal.

On the following day the edges of the wound were approximated by a strip of plaster ; the breathing was calm, and almost entirely through the larynx.

The wound gradually closed, the patient's convalescence was uninterrupted, and she was dismissed cured, a week after admission.

Remarks. This case is instructive as exemplifying the uncertainty which sometimes exists as to the presence of the foreign body. The accident frequently occurs when the child is playing ; the child is suddenly attacked by a convulsive cough and threatened suffocation ; on recovery from this paroxysm, it says it has swallowed a plum or cherry-stone ; but as the symptoms pass off, and the breathing and speech become natural, the friends think that the foreign body has either been swallowed or coughed up, and that the danger is past ; and medical aid is deemed unnecessary till another paroxysm of threatened asphyxia suddenly occurs. Such was the history in the case last narrated ; but this case was even more complicated, because the convulsive cough had expelled the plum-stone, and there was therefore a probability of the smaller body having also been expelled.

When I saw the patient, her breathing was easy, both sides of the chest expanded naturally, her voice was quite natural, and she spoke freely. The only positive symptom was a somewhat croupy sound when she coughed ; but her mother stated that any cold or irritation always produced that symptom in her ever since she had had hooping-cough, two years before.

On examination with the stethoscope over the trachea and chest, neither my friend Dr Dunsmure nor myself could detect any sound indicative of a foreign body moving in the air-passages. I thought, indeed, that there was a peculiar sound a little below the right sterno-clavicular articulation ; but nothing decided, or at all like what I have heard in other cases of foreign bodies in the trachea. But, in opposition to the view that the stone had been expelled, the girl stated that she felt the cherry-stone go down when the plum-

stone was expelled, and that she still felt it at times in her throat (pointing to the trachea); the cherry-stone could not be found anywhere near where she had been playing; and Mr Adams, a young medical man, who first saw her, distinctly stated that the symptoms were those of a foreign body having passed into the trachea.

Under these circumstances, having everything prepared for tracheotomy, we determined to ascertain the presence of the foreign body by inverting the patient and shaking her, so as to throw the stone (if in the air-passages at all) towards the larynx, and render the symptoms of its presence unequivocal.

This was a somewhat hazardous experiment, but safer than leaving the question in doubt.

As even this manœuvre produced no cough or paroxysm, our doubts as to the presence of the stone in the trachea or bronchi became greater. I therefore recommended that she should be taken to my wards in the Infirmary, where she would be carefully watched, and where surgical aid could be had at once, if necessary.

I saw her twice during the evening while she was asleep, and her breathing was then quite calm and natural. The occurrence of the paroxysms of suffocative cough during the night left little doubt as to the propriety of tracheotomy, and the operation was at once decided upon in the consultation, although at that time she was again quite free from any urgent symptom.

In cases like this, where there is considerable doubt as to the presence of the foreign body, it may be deemed advisable to wait, if the patient be placed in such circumstances that tracheotomy could be immediately performed should symptoms of suffocation supervene; but I confess that my experience in this case would lead me, notwithstanding the negative evidence afforded by auscultation, to urge the performance of the operation, so as to place the patient beyond the risk of a sudden fatal paroxysm, such as happened in the case alluded to in the Society by Dr W. T. Gairdner, where a child, in very similar circumstances, died in the hospital before the house-surgeon could reach the ward.

Doubtless there are cases on record where foreign bodies have passed into the bronchi, and have after a time been ejected by coughing; and sometimes this has occurred even after tracheotomy had been performed without success. But such rare exceptional cases can never form a rule for practice; and, to say nothing of the immediate risk of asphyxia, the continued irritation induced by the presence of even a small foreign body, is almost certain to induce disease in the lungs, and ultimately to destroy life. In a female, said to have died from phthisis, with constant cough, I found thickening of the tracheal mucous membrane, and on opening the larynx, discovered in one of the ventricles the pip of an orange, partly confined in its position by bands of lymph. The history of the case, so far as it could be traced, left but little doubt that the irritation of the foreign body had been the origin of the pulmonary disease.

But the propriety of operating early in such cases is now so generally admitted, that I need not insist on it.

In performing the operation in such cases, it is of great importance to hold the incision in the trachea widely expanded, as the elasticity of the rings tends to close it, and so to impede the expulsion of the foreign body. In former cases, I have inserted the points of my dissecting forceps and then expanded the blades; but in this case I adopted the simpler plan of inserting the thin ivory handle of the scalpel I was using, and then turning it flat at the upper part of the incision; it thus widely expanded the tracheal opening, occupied the least possible space, and effectually prevented any risk of a foreign body passing from the larynx into the bronchi; whilst it also gave distinct evidence that the cherry-stone must have been in the trachea, and not in the larynx, as the peculiar cough had led us to suspect.

Whilst this communication was at press, I was called on to perform tracheotomy in a case of true croup, which I now add, as bearing upon the question of the propriety of operating in such cases.

Case.—The patient, D. R——, 7½ years of age, came home from school on the afternoon of the 21st January last, on account of a constant irritating cough, but he complained of no difficulty of breathing, nor any other urgent symptom, till about 8 P.M. on the 22d, when the dyspnœa rather suddenly supervened, and increased so rapidly, that a medical man was summoned, and found him so ill that he recommended me to be sent for to perform tracheotomy. When I saw him, about half past 10, he appeared moribund, breathing only at long intervals, the chest not expanding, the pulse scarcely to be felt. Having explained the probability of the child dying during the operation in such circumstances; the parents still expressed their desire that the chance might be afforded him. I accordingly performed the operation, and on inserting the tube, some mucus was ejected. By keeping up artificial respiration, administering enemata of port wine, and applying sinapisms to the abdomen, the respiration and circulation gradually became restored and regular, but the pupils remained dilated, insensible to light, and the child was quite unconscious. In about two hours after the operation, he became sensible, expressed relief, breathed easily, and had some sleep, and in the morning I was equally surprised and gratified to find him in a state which promised every hope of success. At noon I changed the tube, and replaced it by a double one, so as to ensure it being kept thoroughly clean. He had a dose of grey powder, and small doses of antimonial wine were ordered to be given at intervals. In the afternoon, however, the breathing again became difficult, although the tube was quite clean, and at 10 at night I found him tossing about, with great dyspnœa and rapid pulse. The tube was again withdrawn and examined, and found free from obstruction, and replaced by another, but without any relief. I bled him to the amount of 3 oz., with temporary relief to the urgent dyspnœa and violent action of the heart, but he soon relapsed into the same state, became insensible, and died about midnight.

On examining the body, the larynx and a considerable extent of the trachea were found to be lined by a tubular effusion false membrane, the lower portion of which had passed further down than the incision in the trachea, but had been pushed aside by the tube, when introduced. Patches of lymph were found at

the commencement of both bronchi, whilst the smaller subdivisions of the bronchial tubes were at many points quite blocked up by little masses of exudation. There was no great amount of mucous effusion in the bronchi, but the substance of both lungs was much congested.

Remarks. The exact situation of the croupous exudation in the larynx and trachea, and its relation to the opening in the latter, are well shown in the accompanying plate (Fig. 2). It will be seen how, in such cases, sudden asphyxia might occur on introducing the tube, or how the false membrane, if it passes far down, may act as a valve at the end of the tube, and impede expiration in some instances; whilst the manner in which the lymph is effused throughout the bronchial tubes, at different points, teaches us that, however marked the immediate relief afforded by the operation, we must often expect to have our hopes disappointed by the obstruction to respiration arising from that cause.