Remarks

ON

EIGHTEEN CASES OF SPINAL ANALGESIA
BY THE STOVAINE-STRYCHNINE
METHOD OF JONNESCO,

INCLUDING SIX CASES OF HIGH DORSAL PUNCTURE.

BY

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It will be within the recollection of the members of the medical profession that in the autumn of last year Professor Thomas Jonnesco of Bucharest demonstrated before the Surgical Section of the Royal Society of Medicine, and also in the operating theatre of the Seamen's Hospital, a method of spinal analgesia introduced by him with the object of rendering possible operations on the head, neck, and upper extremity. As I was mainly responsible for these demonstrations, and have since then submitted Jonnesco's method to the test of practical application in my wards, I have ventured in this communication to place the results obtained before my professional *confrères*, as much to satisfy many inquirers as to issue a warning to those who may wish, like myself, to see the practice of spinal analgesia extended to the upper regions of the body. Jonnesco's method is based on the supposition that the addition of neutral strychnine sulphate to the stovaine employed is capable of overcoming the danger of respiratory paralysis when the injection is made between the spines of the first and second dorsal vertebrae, or when, the solution having been injected at a lower level, it has been purposely allowed to gravitate to the upper regions of the cord, the patient being in the Trendelenburg position.

With regard to the results obtained by Professors Jonnesco, Janio, and Nasta,¹ it must be admitted that, as reported, they would suggest a very high measure of success and safety, and, compared with my cases here reported, show a marked contrast, since it is claimed that in no case was any ill effect noted. Whether this is due to exceptional experience, or to some peculiarity in the class of patient submitted to operation in our respective countries, I am unable to say; it is, however, reasonable to suppose that the method, when first attempted by Professor Jonnesco, was as new to him as it was to me when I followed his example. Whatever the results obtained in Bucharest may have been, it will be remembered by those who were present in the operating theatre of the Seamen's Hospital, that of the three cases injected by Professor Jonnesco by his own method and using his own drugs and instruments, only one—a case of tuberculous cervical glands—was completely successful. In the second—a laparotomy—the injection was made in the dorsi-lumbar interspace, and the patient, although analgesic, so far as his skin and muscles were concerned, to a point considerably above the level of his fifth cervical vertebra, complained of dragging sensations when his intestines were manipulated, and had to be submitted to a general anaesthetic. The third case, that of a boy of 12, was given 2 cg. of stovaine and $\frac{1}{2}$ mg. of strychnine, with a view to exploration of his mastoid antrum; complaining of pain on the application of the gouge, he was given a second dose of the same amount; he still complained of pain, and was then given chloroform. It is, however, only fair to say that this boy assured me on the following day that, being afraid, he had lied, and that he had experienced no pain whatever, and that it was the grating of the metal on the bone which frightened him. Further, the fact remains that all three of these patients were analgesic to above their phrenic origins, two of them actually to the vertex, and yet there was neither respiratory paralysis nor any ill effect afterwards.

The reason of the early publication of so few cases from my own wards is, I regret to say, that I have not been convinced of the safety of Jonnesco's method; nor, from what I have seen of it, do I feel justified in employing it further for the present. I have set forth the report of my

cases without any attempt either to magnify the importance of those which were successful, or to mitigate the adverse facts in those in which the method failed. The statements with regard to each are strictly accurate in every detail.

Professor Jonnesco claims as his method both high and low punctures whenever strychnine is combined with stovaine. I have therefore included all such cases in my report, although some of the latter might possibly have been done equally well without strychnine, for I have frequently obtained analgesia to the clavicles by stovaine alone without any sign of respiratory paralysis. The chief interest, however, lies in the six cases of high dorsal puncture (Nos. 7, 8, 10, 12, 14, 15), and in the two cases (Nos. 1 and 2) in which, the puncture being made at the level of the eighth dorsal spine, the analgesia rose above the phrenic origins, and in that of No. 6, in which artificial respiration was successfully employed for a period of sixty-five minutes.

It is a matter of great regret to me personally, as I am sure it will be to Professor Jonnesco, whose great courtesy I wish to acknowledge most cordially here, that these cases have not in my hands borne out his contention that the addition of strychnine is capable of preventing respiratory paralysis. The fact is, however, obvious, that although in some cases respiratory paralysis does occur, there are others in which there is no sign of it. In the state of our knowledge of the subject, and with the drugs at present at our command, the method appears to me to be fraught with considerable danger, apart from which the condition of a patient suffering from respiratory paralysis and yet perfectly conscious, even if artificial respiration can be successfully applied, is one of great mental anguish and bodily discomfort, and extremely harassing to witness.

CASE I.

A. R., aged 27, a man of spare physique, suffering from a left-sided empyema. He had been ill for some weeks, and at the time of operation his appearance was hectic, his left chest quite motionless, and his intercostal spaces obliterated. Pulse 110. Temperature 102.5°.

Not having at hand the dry stovaine employed by Professor Jonnesco,² I employed 5 cg. of Barker's stovaine-glucose solution, to which was added 1 mg. of neutral strychnine sulphate. This was injected between the seventh and eighth dorsal spines without difficulty, the patient being in the left lateral position. At the end of one minute he was turned over on to his back; the Trendelenburg position was not used, but no attempt was made to keep the patient's head elevated as in the ordinary form of spinal analgesia. The analgesia rose steadily to the level of the eyes in three minutes, and descended to about the groins. Respiration continued unaltered in rhythm or amplitude, and short of slight nausea for a moment or two, the patient experienced no discomfort. A portion of the eighth rib was resected and the empyema evacuated. The patient felt nothing of the operation, and his convalescence was uneventful. During the analgesia, which lasted for 40 minutes, any operation might have been easily accomplished between the chin and the umbilicus, the analgesia being deep over this area. There was neither sickness nor headache. Pyrexia could not be estimated, as the case was already septic.

CASE II.

J. C., aged 35, admitted to hospital for a small epigastric hernia of some months' duration. A man of good physique; 5 cg. stovaine and 1 mg. strychnine were injected as in the above case, but in the sitting position. Patient was at once placed upon his back, the head not being at all raised. Analgesia rose gradually to the level of the eyebrows without any interference with the intercostals or the diaphragm. No inconvenience on the table other than slight nausea. The analgesia extended to the middle of the thighs, and was quite satisfactory in the epigastric region. It lasted about 50 minutes, and was followed by no ill effects of any kind. Pyrexia.

CASE III.

W. H., aged 43, admitted for complete forward dislocation of the tibia on the femur, with rupture of all the deep structures behind the knee-joint, resulting in gangrene on the third day. Injection performed in the left lateral position; 6 cg. stovaine + 1 mg. strychnine given through the dorsi-lumbar interspace. Strychnine added in this case, as, owing to the patient's condition, it was thought that the Trendelenburg position might be required during operation. Analgesia rose to the level of the nipples, and amputation was performed at the middle of the thigh. The analgesia was perfect. There was neither vomiting nor faintness, nor was there any shock following the operation. Analgesia lasted about forty minutes; there was no subsequent pyrexia.

* Cases I and II were both done prior to the visit of Professor Jonnesco to London.

† This of course refers to the amount of the drug in the solution.

CASE IV.

H. B., aged 14, admitted for undescended testis. Injection consisted of 4.5 cg. stovaine-glucose + $\frac{1}{4}$ mg. strychnine. Analgesia rose to the level of the eighth dorsal vertebra, and was perfect. Patient vomited once on the table. The testis was transplanted to the scrotum without difficulty. Analgesia lasted thirty-five minutes, and was followed by no after-effects other than pyrexia, which lasted four days, and ranged from 99° to 99.5°.

CASE V.

H. L., aged 26. Admitted for perforated duodenal ulcer. This was the first case submitted by me to injection after the visit of Professor Jonnesco to London, and by his advice I did not employ mid-dorsal puncture, but made the injection in the dorsi-lumbar interspace, using stovaine (dry) 10 cg. + 1 mg. strychnine, and placing the patient at once in the deep Trendelenburg position. Analgesia rose slowly to the level of the fifth dorsal area, and remained there; accordingly, at the end of fourteen minutes I again injected 3 cg. stovaine + $\frac{1}{4}$ mg. strychnine, and, as before, used the Trendelenburg position. This was followed by a rise of analgesia to the level of the second dorsal area, after which the abdomen was opened. Much turbid fluid appeared along the ascending colon and among the intestinal coils, and with great difficulty, owing to the narrowness of the costal angle and the depth of the thorax, a perforation was found in the first part of the duodenum. The perforation had become sealed off by recent lymph, and the patient's condition precluded a gastro-enterostomy. Accordingly the abdomen was cleansed by sponging, and drains were placed in the right loin and pelvis. Only once during the operation did the patient complain of dragging and nausea when the stomach was pulled upon. No pain was felt till the last skin sutures were being inserted, the analgesia having lasted 70 minutes. Recovery was rapid; there were no after-effects. In spite of the large dose (13 cg. in all) the intercostal muscles were quite unaffected and strong expiratory efforts could be made. There was complete absence of any increase of shock, in spite of prolonged manipulation of the bowels, and the patient's condition was distinctly better after than before operation.

CASE VI.

N. B., aged 32. This patient, a nurse, was seen by me for acute haematemesis occurring on three consecutive days. She was subject to gastric ulcer, and had been ill on previous occasions. When I first saw her she was blanched, bringing up repeatedly small quantities of blood; her pulse was rather feeble and about 125, and her respirations sighing and about 14 to the minute. She was obviously very ill, and was said to have brought up in all about three pints of blood in the previous three days. Fearing that the vomiting after a general anaesthetic would result in a fatal haemorrhage, I resolved to attempt an operation by the method in question. I had no dry stovaine with me, nor had I strychnine. I therefore used 8 cg. stovaine-glucose solution + 1 mg. strychnine, the latter drug being made up from tabloids by the dispenser of the institution to which the patient belonged. I was very doubtful of the potency of this last drug, and expressed the opinion that it might fail, and that if it did respiratory paralysis might result. After consultation with her medical advisers, it was resolved to risk the injection—first, because the patient was still bleeding; secondly, because I am firmly convinced of the fact that stovaine does not paralyse the heart; and, thirdly, because this being so, I felt confident that if respiratory paralysis should occur, I could keep the patient alive by artificial respiration, she being of light build and a young woman. The injection was therefore given in the dorsi-lumbar interspace, and the head end of the table was slightly lowered. Two minutes later the patient, without uttering a sound, became completely unconscious and ceased to breathe either with her diaphragm or her intercostals. Her pulse at the moment of injection was 130. I now commenced artificial respiration, keeping nearly as possible to the normal rhythm, and at the end of ten minutes the pulse had fallen to 90, and was fuller and stronger than before; such colour as she had the patient kept very well. Her pupils at this time were slightly contracted. At the end of half an hour a pause was made to see if there was any movement of the diaphragm, but none was observed; the pulse was regular, and the aorta could be seen to be pulsating steadily and with fair strength. At the end of an hour the pupils began to dilate a little, and the eyelids, which had been half closed, gradually opened; there was also a suspicion of movement in the lips. A pause was again made, when it was found that the diaphragm was beginning to move; it, however, ceased again, and artificial respiration was again resorted to. Five minutes later the patient moved her head and began to breathe softly; presently she was conscious and asked where she was; she was at this time analgesic to the clavicles. Analgesia rapidly passed off, there was no further vomiting nor retching, and the patient gradually recovered after a prolonged convalescence. It should be stated that during the last fifteen minutes intravenous infusion of three pints of dextrose solution was performed by one of the resident medical officers through the long saphenous vein. Altogether, artificial respiration had been performed for a period of sixty-five minutes. No operation, of course, was possible.

I was at first inclined to attribute the failure of this case to the fact that the strychnine was in tabloid form, and had been kept for some months; from later experience, however, I am compelled to forego this hypothesis. Strychnine is one of the most constant of the alkaloids, rarely losing its potency or its crystalline form. It is possible that in the weak condition of

the patient the dose was unnecessarily high; at the same time Jonnesco advises a dose of 8 cg. to 10 cg. in cases of high abdominal section. I now believe that the trouble was due to the fact that the method itself is at fault, and that strychnine is not always to be depended on for the prevention of respiratory paralysis.

CASE VII.

K. W., aged 22, a Russian, was admitted for Jacksonian epilepsy of the left side, resulting from an old depressed fracture of the right fronto-parietal region, the injury having been received from the falling of a pulley-block nine months previously.

Injection consisted of 3 cg. stovaine (dry) + $\frac{1}{4}$ mg. strychnine, and was given in the sitting position, the puncture being made between the first and second dorsal spines. The patient was hardly aware of the puncture, which was made without difficulty, and was at once placed upon his back, and the head and shoulders were lowered. In two minutes analgesia was complete to the crown of the head, and to a point just below the umbilicus, remaining quite perfect for over half an hour. A semilunar flap was raised from the scalp over the depression, and a disc of the cranial vault measuring 2.5 in. in diameter was removed by means of the trephine and gouge forceps. The patient chatted of various subjects throughout the operation, only remarking once of any pain, when the lowest of the sutures was inserted just above the eyebrow. There was no alteration whatever either in pulse or respiration, both of which were normally performed. After the operation he expressed his thanks, and walked back to his bed saying he felt none the worse for his experience. He slept well that night and the following night, having neither headache nor vomiting. The following day he was sleeping, and at tea-time could not be roused; the house-surgeon was sent for, and found him comatose, his breathing being stertorous and both his pupils dilated. He was at once seen by my colleague, Mr. Choyce, who realized from his appearance that it was too late to save him; death occurred shortly afterwards. A post-mortem examination revealed a large clot in the operation area due to secondary haemorrhage, presumably from a torn branch of the middle meningeal artery, although every care had been taken at the operation to provide against such an accident. The puncture in the dura mater was found between the spines mentioned, and the cord and its membranes and the base of the brain were found to be perfectly normal.

CASE VIII.

W. B., aged 35, was admitted for a fusiform enlargement of the lower half of the right humerus and crepitus about the condyles and in the elbow-joint. The diagnosis lay between sarcoma and gummatous osteitis. The skiagraph did not help much, the showing in the upper half corresponding closely to the former, while that of the lower half closely resembled the latter disease. I therefore resolved to explore, and in the sitting position I injected the patient exactly as in the last case, placing him at once upon his back and lowering the head and shoulders. In five minutes analgesia was complete from the vertex to the costal margin. Respiration was in every respect perfect, and the analgesia, which lasted for forty-five minutes, would easily have permitted of the performance of an interscapulo-thoracic amputation, had the case proved to be malignant. It was, however, gummatous, and the medulla being extensively disorganized as high as the upper third of the bone, it was entirely removed with a sharp spoon; the cavity was packed with gauze, and the wound, 7 in. in length, partly sutured. The whole operation was entirely painless, and the patient expressed himself as being "delighted with the method." His temperature was raised to 99° and 99.5° for the two subsequent days, remained normal for a day or so, and then again rose slightly as the result of the inevitable discharge. There was neither sickness nor headache.

CASE IX.

L. M., aged 36, a somewhat delicate woman although well developed, was seen by me in consultation for chronic ovaritis; she was in fact sent to me with a view to operation. Owing to her aversion to general anaesthesia, it was arranged to operate by spinal analgesia.

In the sitting position an injection was made of 8 cg. stovaine + 1 mg. strychnine (the same dose, it will be noted, as that which led to respiratory paralysis in Case VI) in the dorsi-lumbar interspace. Analgesia rose steadily to the nipples without producing faintness or other discomfort. The abdomen was opened, and the right ovary, being found to be small and cirrhotic, was removed in the usual manner. No nausea was felt on pulling on the uterus. The patient's pulse, which had been 130 before operation, steadied down during the operation, and was under 90 when it was finished. The analgesia lasted about an hour, and was quite perfect; it was followed by slight pyrexia for three days, otherwise there was nothing unusual to note.

CASE X.

J. B., aged 59, admitted for carcinoma of the tongue and secondary glands in the neck. It was not my intention to attempt removal of the tongue by this method, as I do not think the hardest patient would care to face a severe tongue or jaw operation with his full consciousness retained. As this man expressed no objection to having the glands removed by its means, I submitted him to it. The injection was performed as in Cases VII and VIII, the patient being placed at once upon his back, with the head and shoulders lowered. Analgesia was less extensive, although the dose was the same as in the two cases mentioned, the limits being from the forehead above to

the costal margin below. Although the patient was not aware of it and suffered no discomfort whatever, I noticed that the intercostal muscles were not acting fully: the diaphragm was moving with perfect freedom. No nausea, vomiting, nor faintness were experienced. Subsequently the diaphragmatic excursions became much less extensive for some minutes, but the patient still remained comfortable. The pulse was very slow throughout, being not more than 42 to 58; this, however, was subsequently found to be normal in this patient. Respiratory rhythm remained constant at 30, the increase over the normal being probably accounted for by the extra labour thrown upon the diaphragm by the intercostal paresis.

The analgesia was perfect, and permitted of entire removal of the submaxillary and cervical glands and ligature of the lingual and facial arteries. Its duration was thirty-five minutes. The patient felt nothing whatever of the operation, and at its conclusion walked back to his ward. There were no subsequent complications except pyrexia of two days' duration, to the extent of 99.4°.

CASE XI.

C. R., aged 60, admitted for carcinoma of the cardiac end of the stomach. Patient was in a weak state, and the case was not in any way a promising one for gastrectomy, which was, however, attempted at his request.

The injection consisted of 6 cg. stovaine + 1 mg. strychnine, given through the dorsi-lumbar interspace, the patient being in the left lateral position, with the head of the table lowered. Analgesia did not extend higher than the nipples, and as he complained of pain as soon as the parietal peritoneum was incised, and when the stomach was pulled upon, chloroform was substituted and a Witzel's gastrectomy performed. No subsequent ill effects were noticed which could be attributed to the injection. The patient died at the end of forty-eight hours from exhaustion, the peritoneum being found at the autopsy clean and free from any leakage from the gastrectomy, which was sound.

CASE XII.

W. W., aged 40, admitted under the care of my colleague, Dr. Nixon Biggs, for otitis media. At the request of Dr. Biggs, who proposed to explore the mastoid antrum, I injected the patient between the first and second dorsal spines with 3 cg. stovaine + $\frac{1}{2}$ mg. strychnine, in the sitting position.

The head was lowered as before, and in seven minutes the patient was analgesic from the vertex to the costal margin, with the exception of the nasal septum, the palate, and the pharynx. The tongue was analgesic in the anterior third. No trouble whatever was experienced by this patient either as regards his respiration or pulse, both remaining in every respect normal. There was no nausea, vomiting, or other unpleasant symptom. No pain was felt until the separation of the cartilage of the deep part of the meatus was attempted; this was apparently quite sensitive, although the bone was freely gouged without any pain, and it is possible that had cocaine been instilled the operation might have been completed painlessly. General anaesthesia was, however, substituted. There were no after-effects in this case.

The pain complained of was probably due to the immunity of the auricular branch of the pneumogastric nerve, this latter, like the glosso-pharyngeal, being apparently little affected by these injections.

CASE XIII.

L. C., aged 43, sent to me by Dr. Croft Watts, of Farnborough, for a large abdominal tumour of six weeks' history.

Patient was a woman of spare build and very nervous temperament, and her temperature suggested mild sepsis. An injection of 8 cg. stovaine + 1 mg. strychnine was given in the dorsi-lumbar interspace, the left lateral position being employed. On lowering the head end of the table, the analgesia rose slowly to the fourth dorsal area without inducing any untoward symptoms, the patient being quite comfortable. On opening the abdomen below the umbilicus the tumour was found to consist of the right ovary, which had attained the size of a Rugby football. To it the appendix was adherent, and from the right side of the uterus there grew a fibro-myoma of the size of a Jaffa orange. No nausea or pain was induced by any amount of traction on the pelvic organs, and accordingly the ovary, appendix, and the fibroid were removed without difficulty. The former contained 6 pints of fairly recent blood; the appendix was not diseased. Slight pyrexia for three days represented the only after-effect, and the patient made an uninterrupted recovery. The analgesia lasted an hour and a half, and was of the most perfect order.

CASE XIV.

H. P., aged 20, admitted under Dr. Nixon Biggs for sub-mucous resection of the nasal septum. Injection was performed exactly as in Cases VII, VIII, X, and XII, except that in this case some cerebro-spinal fluid was drawn into the syringe so as to mix with the solution, the whole being then projected into the theca. I thought that in this manner I might cause a more general diffusion of the solution and thus avoid irregular analgesia. The patient was then placed upon his back and the head was lowered. Almost at once the patient's respiration became embarrassed and he became terrified, gasping for air, struggling on the table, and whispering that he was suffocating. It was seen that his diaphragm, although moving, was almost inactive, the intercostals being completely paralysed. He was reassured as to his safety, and in less than a minute his breathing became easier. His pulse and colour remained good, and in a short time he became calm. Strychnine $\frac{1}{2}$ grain was given hypodermically, but neither oxygen nor artificial respiration

were employed. He was now found to be analgesic from the vertex to the costal margin, the pharynx and tongue alone being sensitive, and he consented to undergo his operation, which was easily carried out quite painlessly and with very little haemorrhage. Complete analgesia lasted thirty minutes. There was neither headache nor vomiting, and only slight pyrexia; next day he said he felt well, but acknowledged that for the moment he had been frightened at the operation.

CASE XV.

J. M., aged 40, admitted under Dr. Nixon Biggs for sub-mucous resection of the septum of the nose. Injection was performed exactly as in the previous case, except that, in view of the obvious failure of the strychnine already recorded, the dose of this drug was increased to 1 mg. and the solution increased to a bulk of 1 c.cm., the stovaine remaining the same—namely, 3 cg. In two minutes from the time of injection the patient complained of nausea, and in five minutes he whispered excitedly that he was suffocating. In another moment it was seen that respiration was on the point of ceasing and that he was slightly livid. He was obviously terrified, and protruded his tongue convulsively with a licking movement, opening and shutting his mouth rapidly, and throwing himself into convulsions on the table. Although these movements of the body suggested opisthotonos there was no spasm of the muscles, and I fancy they were simply due to terror.

Artificial respiration was now commenced and a hypodermic injection of $\frac{1}{30}$ grain strychnine was given. Almost at once the colour returned, and in two minutes the patient was able to breathe with his diaphragm, his fear leaving him as his respiration improved. The analgesia was found to extend from the chin in front and the occipital protuberance behind to the umbilicus below. No other part of the head was analgesic, and taste and hearing were not affected. The pulse remained between 80 and 90 throughout, and was strong and regular. As analgesia was lacking, considering what the patient had undergone, it was determined to postpone the operation, and he was sent back to bed.

Seen next day, he was none the worse for his experience; he had not been sick and had had no headache; but he said that some years before he had been washed overboard and nearly drowned, and that the feeling when on the table closely resembled that of the initial stages of drowning. He had no pyrexia.

This case determined me not again to put any patient to the risk of such suffering by the employment of Jonnesco's method, so far as high injections were concerned, and proved to me incontestably that strychnine is by no means to be relied upon in these cases.

CASE XVI.

M. H., a woman aged 55, was sent to me by Dr. Fleming, of Haversstock Hill, for the cure of a gigantic umbilical hernia by the implantation of a filigree of silver wire.

I have seldom been able to accomplish these very extensive operations by the aid of spinal analgesia, but have always wished to do so owing to the greater relaxation of muscle and the absence of straining which it guarantees. This hernia measured 35 in. in circumference, and in the erect position extended downwards over the upper third of the thighs. The operation took place in the Hampstead Hospital.

An injection of 10 cg. stovaine (dry) + 1 mg. strychnine was given in the dorsi-lumbar interspace, the patient being in the sitting position. She was then placed on her back, and the head end of the table lowered. In five minutes the analgesia had extended to the level of the nipples, and in another minute was up to the third rib. The table was then levelled, and the operation was commenced. A large mass of omentum was ligated and removed, the sac cut away, and the intestines returned with some difficulty. The manipulations, however, produced no sensation of nausea or pain, and the abdomen was soon closed. The recti muscles were brought out of their sheaths, which were opened extensively for the purpose, and a filigree measuring 9 in. by 5 in. was implanted between the posterior layers of these sheaths and the muscles, which were then approximated over the filigree. The operation lasted fifty minutes and the analgesia ninety minutes. There were no after-effects of any kind except pyrexia for three days, ranging to 100°, but some days later the patient had a slight attack of pneumonia, and a mild one of facial erysipelas, from which she soon recovered. Her convalescence was rapid after this. During the operation the patient was comfortable and chatted freely, saying she much preferred the method to general anaesthesia.

CASE XVII.

W. K., aged 15 years 6 months, admitted for left renal calculus. Patient was placed in the left lateral position and an injection made in the dorsi-lumbar interspace consisting of 6 cg. stovaine + 1 mg. strychnine. The head end of the table was lowered, and at the end of a minute patient was turned upon his back. Analgesia extended to the level of the second rib. The bladder was washed out and a cystoscopic examination made; blood was found to be coming from the ureter of the suspected side, which fact strengthened the evidence of a somewhat doubtful skiagram. The patient was now turned over on to the sound side and nephrolithotomy was performed. Up to the moment of opening the kidney, these proceedings had been perfectly painless; now, however, he began to complain of dragging pain, and in a short time I was forced to resort to chloroform to complete the operation. The analgesia had lasted forty minutes and had been perfect, and had it not

been for the time taken up in washing out the bladder and by the cystoscopy, the main operation could easily have been done by this means alone. A small impacted calculus was found in the lower end of the pelvis of the kidney. With the exception of a single vomit fifteen minutes after injection, there were no after-effects of any kind. Pulse remained at 90 and respirations at 20 throughout; there was no shock, and patient was well and comfortable next day.

CASE XVIII.

R. T., aged 48, admitted for an irreducible inguinal hernia of gigantic proportions. In circumference it measured 35 in., and it depended to a point 16 in. below the pubic spine. The patient was a stoutly-built but rather plethoric man, and the risk of so prolonged an operation as would be required was fully pointed out to him. He begged that something might be done, since not only could he obtain no employment, but also the weight of the gradually increasing mass made it impossible for him to get about. He very pluckily agreed to take any risk, and this rather against my advice. Three weeks were spent in getting rid of some oedema of the scrotum and endeavouring to lessen the size of the mass, and then operation was performed. The injection was given in the right lateral position, and consisted of 7 cg. stovaine + 1 mg. strychnine given in the dorsi-lumbar interspace. The patient was put in the Trendelenburg position not only to cause the solution to rise in the theca, but also that gravity might assist in the return of the hernial contents. The analgesia rose to the nipples. On opening the sac, it was found to contain the caecum, appendix, ascending and transverse colon, 10 to 12 ft. of ileum, and a large mass of omentum. The latter was removed painlessly, and I then began to attempt to return the bowel. At the end of nearly ten minutes I had made little progress, and the patient was complaining of "pain in his chest" and had vomited twice; his pulse and respiration were both good. Chloroform was therefore substituted, very little being required to keep him fully under. Ultimately by returning the bowel inch by inch from the distal to the proximal end I succeeded in reducing the whole of it. As he showed no signs of shock I separated the neck of the sac from its surroundings without attempting to remove the body and fundus, and closed it. I then implanted two silver wire filigrees by the method I have elsewhere described,² closed the wound, and returned the patient to bed. As regards the analgesia there is nothing further to note; it failed, as so frequently happens where intestinal operations are concerned, to overcome the sensation of dragging and nausea. For any other than such operations it would have been ideal. As I had feared, the interference with the bowel proved to be too much for the patient; paralytic ileus set in twenty-four hours later, and in spite of a caecostomy done under local anaesthesia, the distension increased and he died from embarrassed respiration and oedema of the lungs. No pathological change of any sort was found in the spinal cord or meninges. Although I hesitated to perform this operation on account of the risk, I was encouraged to hope it might be successful, owing to the fact that three years ago I operated upon, and succeeded in curing by the double-filigree operation, a patient whose hernia almost exactly resembled the one here described, and which measured 25 in. in circumference and 15 in. in length. The operation was done under spinal analgesia.³

These, then, are the results I have obtained by the use of Jonnesco's combination, and it must be confessed that as a whole they are disappointing. The four successful cases of high puncture serve, so far as analgesia above the phrenics is concerned, to show that the method has, at least, some element of possibility in it; it is, however, uncertain, imperfect at present, and of doubtful value in replacing general anaesthesia. The unsuccessful cases of high puncture show it to be fraught with danger, and from the humane standpoint unjustifiable. The cases of low puncture serve to show very little else than that strychnine can be injected into the spinal canal without producing spastic symptoms, and that it undoubtedly results in a shortening of the period of analgesia usually resulting from the use of stovaine alone. The effects of the analgesic on the cranial nerves appear to be irregular. So far as I have been able to see, the first, second, third, and fourth remain unaffected; the fifth is at times under control, as is also the seventh; the sixth, eighth, ninth, tenth, and twelfth are unaffected, while the eleventh may or may not be paralysed. That the four last nerves should escape when the trigeminal is affected is a very remarkable fact, seeing that, lying in that portion of the base of the skull to which the injection has most ready access, they must of necessity be bathed in the solution.

It would certainly appear proved by Cases VI, XIV, and XV that stovaine is not a cardiac depressant, although it is to some extent a vaso-dilator, as shown by the slight fall of blood pressure which has been noticed in some of the 500 odd cases of spinal analgesia carried out in my wards at Greenwich.

I can see no object in adding strychnine to cases of low spinal analgesia, since I have found no difficulty in

carrying out operations under stovaine analgesia without it, even when such analgesia has been pushed to the level of the clavicles. I do not mean by this that such a height is to be aimed at; even in skilled hands it is of doubtful safety; but, even if strychnine has been added to the stovaine to make it safer, it is still impossible to rely upon it in any particular case, and it is precisely this fact which has compelled me to forego the further use of Jonnesco's method. The idea it has in view is splendid, but to be of use it must show a high percentage of safety, and this condition it does not at present fulfil.

The above remarks, it must be remembered, apply solely to cases done by the stovaine-strychnine method, the results of which must not be confounded with those of the stovaine-glucose method of Barker. Of these latter cases, considerably over 500 have now been done in the wards of the Seamen's Hospital with perfect satisfaction to the patients, to myself, and to those of my colleagues who have given it a trial. I may say here that in this series, which extends over a period of three years, no case has as yet been met with in which there were alarming or dangerous symptoms either during or after operation; while the simplicity of the method, the comfort of the patient on the table, the immunity from unpleasant after-effects, and the saving of time which it ensures, combine to make it the method of election in cases suitable to its use. It is to me a matter of regret that I have been compelled, owing to the requirements of the authorities of the Naval Medical Service, to employ general anaesthesia in a certain proportion of my cases, in order to furnish material for classes of instruction in anaesthetics, to members of that service taking out courses in the London School of Clinical Medicine. That spinal analgesia is not yet a recognized branch of anaesthetics is to my mind, certainly so far as the Naval and Military Medical Services are concerned, a great misfortune, since it is in these services especially that spinal analgesia must find its highest sphere of utility.

REFERENCES.

¹ BRITISH MEDICAL JOURNAL, 1909. ² *Ibid.*, August, 1909. ³ *Ibid.*

Remarks

ON

ANAESTHETIZING PATIENTS FOR OPERATIONS ON THE THROAT, NOSE, AND ACCESSORY SINUSES.

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THE increasing importance attached to anaesthetics, and the recognition of the fact that the anaesthetic is not the least important part of any surgical procedure, has prompted me to publish the following method, which I employ for anaesthetizing patients during operations on the throat, nose, and accessory sinuses. I have used the method for nearly four years, and lately its scope has been extended to operations on the mouth, face, and neck. The following article, however, is more particularly intended to apply to its adaptation to throat and nose work.

The routine method of anaesthetizing I employ is to induce anaesthesia with ethyl chloride and ether, and then after a varying time to substitute what we in Bristol call the "two-bottle" method—namely, a plain domette-covered mask (Murray's) and two drop bottles, one containing chloroform, the other ether. These two anaesthetics are added to the mask in such quantities and at such intervals as may be thought necessary, the smallest possible amount of chloroform being used, and at times altogether omitted, resulting in a pure, open ether administration. This method is superior to using a definite mixture of the two drugs, as the proportions can be so easily varied to suit individual cases.

On this method is based the one now to be described.

Anaesthesia is induced by ethyl chloride and ether, and maintained by ether vapour delivered to the patient