5. Discretion regarding the oil used makes complications negligible.

6. Of twenty cases, eight improved sufficiently to allow of their return to work.

I am indebted to Drs. Crowe and Costello for assisting in the treatment; also to Drs. McCartney and Allison for the bacteriological investigations.

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FULMINATING MENINGOCOCCAL MENINGITIS

RECOVERY FOLLOWING SYSTEMATIC CISTERNAL PUNCTURES AND POLYVALENT SERUM

BY

J. N. C. FORD, M.A., B.M., B.Ch.Oxon.

AND

GEOFFREY SHERA, M.A., M.D.CANTAB.

CONSULTING PATHOLOGIST TO THE EASTBOURNE HOSPITALS AND TO
THE EAST SUSSEX COUNTY COUNCIL

IN COLLABORATION WITH

SIR JAMES PURVES-STEWART, K.C.M.G., C.B.,
M.D., F.R.C.P.

In view of the high mortality rate of fulminating cases of cerebro-spinal fever the following case seems worthy of record.

HISTORY OF THE CASE

September 11th, 1931.—A strong healthy girl of 22 was watching a tennis match in the morning, though she confessed to having got up feeling "not too fit." In the afternoon she had an attack of shivering, and was brought home and put to bed. At 6 p.m. she complained of feeling feverish, of headache, of pains in the limbs, and of a slight sore throat. She was restless, very flushed, and perspired freely. There were a few small petechial haemorrhages on the trunk and limbs. The fauces were red. The temperature was 106°, and the pulse rapid and full. During the night the patient slept fairly well for some hours, but, about 3 a.m., she became very restless and vomited severely several times. A few hours later she was in a violent delirium, and began to cry out.

September 12th.—The delirium and typical meningeal cry was now accompanied by spasm of the facial muscles, which soon became very pronounced. There was rigidity of the neck, and Kernig's sign was positive. Abdominal reflexes were present at this time; knee-jerks and ankle-jerks were exaggerated; plantar responses were indefinite. The temperature dropped to subnormal during the night, but in the morning rose to 100° (see Chart I). Lumbar puncture put the diagnosis beyond doubt. The spinal fluid was extremely turbid and under high pressure. After centrifuging there was a heavy deposit of pus, with intracellular and extracellular plump Gram-negative diplococci. Pandy's and the Nonne-Apelé globulin tests were strongly positive. The total protein was 0.3 per cent. and the cell count 19,360 per c.mm.; the cells were nearly all neutrophils. A count of the organisms showed 144 per 100 fields. Glucose was absent.

By the evening the full picture had developed. There was marked rigidity (though no head retraction) of the neck and back. Violent spasms of all muscles caused constant movements of the limbs and a typical risus sardonius. The meningeal cry was intensified. No strabismus or any cranial nerve paralysis occurred at any

time. The abdominal reflexes were absent, and the knee- and ankle-jerks were present, though no longer exaggerated. The plantar responses remained doubtful, and in fact were never definitely extensor. But Kernig's sign was very marked.

The tongue was dry and furred, but the skin extremely moist. The eruption had developed into quite large purpuric spots all over the trunk and limbs. (A few days later a typical herpes arose on the upper lip.) The spleen was not enlarged, and never became palpable. Vomiting was not repeated after the first night, but the bowels were very constipated and had to be regulated by enemata throughout the illness. The temperature was 101°, and except at the onset was never particularly high. The pulse rate was 115, regular and full, and remained some-

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what rapid for several weeks (even after the temperature had fallen). There was at no time any evidence of cardiac involvement.

A menstrual period was missed at this acute stage, but the next one appeared as usual the following month. The patient had to be catheterized on two occasions, but thereafter normal control returned. The urine was acid; specific gravity 1022; a fair cloud of albumin was present; and the deposit showed many hyaline casts; there was no haematuria.

Cisternal puncture was performed by Sir James Purves-Stewart under light general anaesthesia, and 40 c.cm. of turbid cerebro-spinal fluid was withdrawn under pressure. Fluid showed 28,160 cells per c.mm., and 136 organisms per 100 fields. Possibly the greater number of cells in the cisternal as compared with the spinal fluid was accounted for by the nearer approach to the maximum local incidence of infection via the cisternal route.

After a slow intracisternal injection of 20 c.cm. of warmed polyvalent anti-meningococcal serum the respirations became very shallow and slow, and finally ceased. Artificial respiration and a hypodermic of camphor restarted the breathing after a few minutes. In addition, 10 c.cm. of the serum was given intravenously to counteract the severe septicaemia. (See table, and notes below.)

On coming round from the anaesthetic, the patient once more became violently restless.

September 13th.—The condition was much the same, there being no change in the physical signs, though the temperature and pulse rate were both down. Cisternal puncture was repeated under general anaesthesia, when 50 c.cm. of cerebro-spinal fluid was obtained, and 20 c.cm. of carefully warmed serum slowly injected. This time there was no mishap, though the respirations became very rapid and shallow; 10 c.cm. of serum was also given intravenously.

The fluid showed increased cellular content, but fewer organisms and more marked phagocytosis; cells 44,800 per c.mm., organisms 128 per 100 fields.

In the evening the patient was rather less violent. Cisternal puncture was repeated, 32 c.cm. of cerebro-spinal fluid being withdrawn; 20 c.cm. of serum was injected, together with 12 c.cm. intravenously. The fluid was now blood-stained and tinged yellow on centrifuging. Glucose was still absent, and the total protein was 0.4 per cent. The cells averaged 28,160 per c.mm. No organisms were visible, and the amount of pus present in deposit was

obviously less. The higher protein content was probably due to some traces of old haemorrhage or temporary loculation.

September 14th.—The delirium lasted until the early hours of the morning, when the patient fell into a natural sleep for a few hours, to awaken conscious though dazed.

Table showing Clinical and Pathological Improvement with Serum

Day of Disease	Clinical Condition	Amount of C.S.F. Withdrawn in c.cm.		Cell Count per c.mm.	Organisms per 100 Fields	Serum Administered—	
		L.P.	C.P.			Intra-theally in c.cm.	Intra-venously in c.cm.
2nd	—	50	—	19,350	144	—	—
p.m.	Violent delirium. Rigidity	—	40	28,160	136	20	10
3rd	a.m. Violent delirium	—	50	44,800	128	20	10
p.m.	Less violent. Rigidity	—	32	28,160	Nil	20	12
4th	a.m. Quiet and conscious. Rigidity	—	50	48,800	4	20	10
p.m.	Taking well. Rigidity	—	—	—	—	—	—
5th	a.m. Mentally alert. Rigidity	15	—	Less	Nil	10	10
p.m.	Less rigidity	—	7	279	Nil	—	15
6th	Left lower abdominal reflex returned	—	—	—	—	—	—
7th	General further improvement	5	—	90	Nil	—	15
19th	Still further improvement	A few	—	210 (lymphocytes)	Nil	—	—
38th	Arthritis	A few	—	5	Nil	—	—
Total	...	70 +	179	—	—	90	82

She recognized her relations, and could swallow and speak, complaining only of slight headache. The spots, which had by now run together into large purpuric patches, were beginning to fade. The reflexes were unchanged.

Cisternal puncture was again undertaken under general anaesthesia, when 50 c.cm. of cerebro-spinal fluid was obtained; and 20 c.cm. of serum was injected and 10 c.cm. given intravenously. Glucose was still absent from the fluid. The cells had risen to 48,800 per c.mm., and the organisms reappeared to the extent of 4 per 100 fields.

By the evening she was quite conscious, and had taken fluids freely throughout the day, so that it was possible to

fluid was not under pressure, and only 7 c.cm. was obtained; it was much clearer; 15 c.cm. of serum was injected. The fluid now showed glucose for the first time. The cells numbered 279 per c.mm. There were no visible organisms, and cultures were sterile.

September 16th.—After another good night the patient was still further improved in the morning, and was able to remember the onset of her illness. The left lower abdominal reflex was just obtained, and Kernig's sign was less marked. The other reflexes were unchanged.

In the evening she complained of stiffness in the back and limbs, and pain and swelling of both wrists.

September 17th.—From now onwards there was a gradual general improvement, and the central nervous system slowly returned to normal. But both wrists, both knees, and both ankles were painful and swollen, with limitation of movement. There was also a faint serum rash on the trunk, which lasted some twelve hours.

Lumbar puncture produced only 5 c.cm. of yellowish fluid, so 15 c.cm. of serum was given intravenously. This was the last dose of serum administered. The fluid showed 90 cells per c.mm. It was sterile.

September 19th.—By now the urine contained only a slight trace of albumin, and no hyaline casts; but red blood cells, epithelial cells, and coliform bacilli were present.

September 23rd.—Both lower abdominal reflexes had returned. But the arthritis was still troublesome, now involving the fingers, wrists, knees, and ankles. For a few days pain was caused by enlarged glands in the posterior triangles of the neck; at this stage there was some catarrh of the nose and throat.

September 29th.—The temperature had settled to normal; and the right upper abdominal reflex had returned. The patient was started on full doses of potassium iodide with iron and strychnine injections.

Lumbar puncture (without an anaesthetic) resulted in a clear fluid, which was under brisk pressure at first. Cells were 210 per c.mm.; of these, 100 per cent. were small lymphocytes. The total protein was 0.18 per cent., and the sugar 0.068 per cent. The Pandy and Nonne-Apelt globulin tests were positive.

October 1st.—Patient sat up in bed. A few days later two negative throat swabs were obtained, and she was declared free from infection, though the arthritis continued.

October 10th.—The temperature, after being normal for twelve days, began to rise again. Four days later the patient did not feel so well, complaining of occipital headache and increased pain in the knees. This was

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give her 10 grains of hexamine every four hours. (From now onwards she continued to take nourishment exceedingly well, and thus wasting never became a prominent feature.) No serum was given this night.

September 15th.—The patient had a good night, and was more mentally alert in the morning. As she was still very rigid, lumbar puncture under general anaesthesia was performed, and 15 c.cm. of blood-stained cerebro-spinal fluid was drawn off, but it was not under pressure; 10 c.cm. of serum was injected, with 10 c.cm. intravenously. The spinal fluid by lumbar puncture showed fewer cells and no visible organisms. A count of the cells was not made. The patient gradually got less rigid during the day, and was able to turn in bed unaided. The temperature and pulse rate were, however, up in the evening; accordingly cisternal puncture was again repeated. The

relieved by radiant heat and an occasional dose of aspirin. All the abdominal reflexes had by now returned, and the knee- and ankle-jerks were brisker.

October 18th.—Lumbar puncture revealed a normal cerebro-spinal fluid. There were 5 cells per c.mm.; one lymphocyte was seen. The total protein was 0.025 per cent. The Pandy and Nonne-Apelt tests were negative, and glucose was present. But as the temperature continued and there was obvious fluid in both knees, the right joint was aspirated and a greenish pus withdrawn. The fluid contained many neutrophil cells. No meningococci were seen or cultured (on tryptagar).

October 22nd.—Both knees were aspirated, and the same greenish pus was withdrawn; one drachm of sterile glycerin was injected into each joint. After this, improvement started.

October 25th.—The left knee was again aspirated, and one drachm of glycerin injected.

November 4th.—Finally, after the temperature had been normal again for seven days, the arthritis ended, with all pain and swelling gone and the return of full movement.

November 7th.—The patient was allowed out of bed, and started a slow convalescence, which continued without further interruption.

January 10th, 1932.—Four months from the onset of the illness she was in perfectly good health, with no trouble from headaches or stiff joints, and leading a quiet but normal life.

FEATURES OF INTEREST

1. The very sudden and acute onset.
2. There was no history of known contact. This was the only case in the district, and no others occurred.
3. The comparatively low temperature after the initial rise. It was normal again on the eighteenth day.
4. The rapid improvement resulting from early cisternal drainage and injection of serum.
5. When injecting serum into the cisterna magna it is advisable to do so very slowly and with carefully warmed serum to avoid interfering with the respiratory centre ; but in any case some degree of apnoea occurs.
6. The cell count and percentage of organisms in specimens of the cerebro-spinal fluid were of the greatest prognostic value, and largely determined whether further serum was or was not required.
7. The patient took nourishment very well as soon as consciousness returned, and there was never any marked wasting.
8. The only complication was multiple arthritis. This started on the sixth day of the illness, and finally ended with pus in both knee-joints, associated with a further rise of temperature (after this had been down for ten days) during the fifth and sixth weeks. Each joint was aspirated twice.
9. Convalescence started at the beginning of the eighth week.
10. There have been no sequels (four months after the onset), and recovery has been complete.
11. Attempts to culture the meningococci were only made comparatively late. Warmed tryagar plates were used.

POINTS IN CONNEXION WITH THE SUCCESSFUL ISSUE OF SIMPLE PROSTATECTOMY*

BY

A. RALPH THOMPSON, CH.M., F.R.C.S.

SURGEON IN CHARGE OF THE GENITO-URINARY DEPARTMENT,
GUY'S HOSPITAL

The subjects discussed in this address are based upon twenty-one years' experience of the operation of prostatectomy at Guy's Hospital. The same general features are observed in both methods of operating—namely, suprapubic and perineal.

PRECAUTIONS BEFORE OPERATION

Before the operation the renal function must be carefully estimated, but there are other examinations to be made—namely, the form of respiration, and the local condition of the penis and urethra. The elderly man with the barrel-shaped chest has also a bowed back, and

the thoracic muscles are hardly doing any work. The diaphragm is doing all the work, and the prominent abdomen is produced partly by this and partly by the development of much fat in the great omentum, in order that a counter-pressure may be provided for the diaphragm. For some time past at Guy's Hospital the massage sister has given instruction in thoracic breathing to all the patients who are going to have prostatectomy performed on them, and the improvement in breathing before and after the operation is most striking.

The penis and urethra should always be most carefully examined in order to make certain that, first, there is absolute cleanliness in the parts, especially with a long foreskin, and, secondly, in order to make sure that there is no obstruction such as is associated with slight degrees of hypospadias, and the more common one of gonorrhoeal stricture. The importance of the latter is twofold. First, the actual obstruction may lead to delay in the healing of the suprapubic wound ; and secondly, because at Guy's Hospital, from the years 1910 to 1916, syphilis and gonorrhoea occurred together in 20 per cent. of all cases of venereal infection, and exacerbations of syphilis may occur after such a proceeding as suprapubic prostatectomy.

Of necessity a catheter is frequently used in the outpatient department at Guy's in order to relieve the patient of urgent symptoms, and I have never regretted its use. Undoubtedly the passage of a catheter twice a day may improve the functioning powers of the kidneys, and make the patient much more suitable for operation.

THE OPERATION

At the operation the bladder is distended with boric lotion till it can be felt above the pubes, and after the catheter has been removed a light tourniquet is tied round the penis ; this is removed directly the bladder has been opened. When the bladder has been exposed a roll of gauze is carefully packed in round the bladder, and the viscus itself is opened by a transverse incision. There is less bleeding when veins are cut across than when they are nicked, as may happen with the vertical incision, which is, of course, parallel to the course of the veins. Moreover, when the bladder is opened the peritoneum comes down into its usual position, and, with a transverse incision through the bladder wall, the incision can be lengthened, if desired, much more safely than with a vertical cut.

During the actual removal of the adenomata of the prostate it is desirable that the patient should be deeply under the anaesthetic. Sir John Thomson-Walker has shown how bleeding may be adequately dealt with, but short of this much benefit will result from the irrigation of the bladder with liquor hamamelidis at a temperature of 110° F. Careful massage of the prostatic cavity may also do much good, expediting, as it does, the contraction of the tissues which lie round the space from which the adenomata have been removed. Messrs. Down Bros. have made for me a special glass drain, with an oblique movable flange upon it, which is capable of being adjusted to the correct level, and it is introduced into the prostatic cavity, which is the only part that needs to be drained.

No catheter is inserted into the urethra, and many cases have healed up in as short a time as fourteen days without any catheter having to be introduced. Special attention is paid to two points on the operating table ; first the testicles, scrotum, and penis are brought up as far as possible on the abdominal wall, and kept there by dressings and bandage ; and secondly, 1 c.cm. of pituitrin is injected as a routine practice. The patient is put back to bed, and sleep is, as far as possible, induced by one injection of morphine.

* Abstract of presidential address to the Section of Urology, Royal Society of Medicine, January 28th, 1932.