inserted into the pneumothorax cavity. Through the thoracoscope the whole pleural cavity can be examined. Through another smaller trocar a small platinum knife on a long piston is introduced in another part of the chest, conveniently for manipulation. Led by the thoracoscope, the knife is placed upon the adhesion and when in position the knife is made white-hot by an electric current and can now be passed through the adhesions.

This operation, by which the author has previously had successful results, was tried in one of the above cases (No. 10) in which a cavity seemed to be kept in expansion by a localised adhesion. This attempt proved a failure owing to the lack of any satisfactory electric outfit. The technique is rather complicated, but the operation is of much interest as a unique example of the surgical possibilities of modern days.

The second method, which may be used in cases where the adhesions do not allow the use of Jacobæus' method, or where it is impossible to apply any larger pneumothorax at all, is to establish the same collapse of the lung as is afforded by a successful pneumothorax by means of an extra-pleural operation, thus causing the bony chest wall to collapse, together with the lung.

The "extra-pleural thoracoplasty" (Friedrich Brauer, Sanerbruch, etc.), has been developed to such a degree of technical and clinical success that, in spite of all more or less justified criticism, this heroic method is really to be reckoned with as a last resort in many cases, which otherwise would not have any chance of successful treatment.

Sanerbruch's technique, which is to be modified according to the special needs of individual cases, leaves the lung in a condition of collapse by removal of larger or smaller parts of all the ribs (excluding the lower one or two) through a long hook-shaped incision running from the spine of the scapula, parallel to the spine down to the tenth rib, which it follows to the mid-axillary line. Through this incision the whole of the back part of the thoracic wall is laid freely open and subperiostal resection can be made to the necessary extent, especially of the spinal ends of the ribs, by the rigidity of which the shape of the thorax is normally kept in its capacious position.

The comparatively encouraging results previously obtained by the author in 60 cases of thoracoplasty made us use this operation in one of the 28 cases in which it was impossible to apply any pneumothorax at all. This case was judged to be so advanced that there was no possible hope of obtaining a lasting result by ordinary treatment.

Pneumothorax was tried in order to check severe hæmoptysis, but the attempt showed that universal adhesions were present. Later on thoracoplasty was performed, but in this case the patient succumbed seven hours after the operation on account of heart failure. This sad complication may have been due to the fact that no other anæsthesia could be provided than general chloroform narcosis. As this operation itself affects the heart a good deal, it is usually performed under local anæsthesia (novocain-suprarenin), or by light ether narcosis, or by a combination of these two kinds of anæsthesia (as suggested by the author; vide *Tubercle*, June 1921). The disappointing results in this case made us feel that further attempts on the same lines must be postponed until the sanatorium could afford an equipment with X-rays and a full operation outfit necessary for the adoption of such formidable surgery.

It is to be hoped that further studies may be made on these subjects in India. The average stage of those tuberculous patients who seek medical help in this country is so advanced as to make it desirable to adopt any treatment by which some of these sufferers may be relieved.

CULTURAL EXAMINATION OF THE URINE IN KALA-AZAR.

By L. EVERARD NAPIER, M.R.C.S., L.R.C.P.,

and

B. M. DAS GUPTA, *Sub-Assistant Surgeon.*

From :—The Calcutta School of Tropical Medicine.

Our excuse for publishing this note is the fact that the success of Shortt (1923) in obtaining a pure culture of the herpetomonad form of *L. donovani* from the urine of a kala-azar patient has led to certain statements on the possibilities of the urine being the transmitting medium of the infection of kala-azar, which are obviously absurd and which were certainly not suggested by Shortt himself.

Both writers have been interested in the possibilities of urine being the transmitting medium of the infection of kala-azar and with this possibility in view made an effort last year to obtain cultures of the herpetomonad form of *L. donovani* from the urine of patients suffering from this disease. In conjunction with Knowles (1923) we attempted to obtain cultures from the urine of six untreated kala-azar patients without success. The findings of Shortt encouraged us to make another attempt. At first we took catheter specimens of urine, but we subsequently found that by carefully washing the meatus with perchloride of mercury followed by distilled water, a sterile specimen could be obtained with rather more certainty and with considerably less trouble to us and discomfort to the patient. The first few ounces of the flow of urine were discarded and then about 25 c.c. taken into a sterile test tube. This was allowed to stand for a couple of hours before a drop or two was pipetted from the bottom of the tube, including the deposit if there were any, into 3 or 4 N.N.N. tubes which were then incubated at 22°C.

Sixteen specimens of urine were taken from 16 different untreated male kala-azar patients in whom the diagnosis had been made (in every case) by the demonstration of the presence of the parasite. *In no case was a culture of herpetomonad forms of L. donovani obtained from the urine.* The results that we obtained were as follows:—

All the tubes became contaminated prior to the first examination in 6 cases.

At least one of the tubes remained sterile for 9 to 12 days, subsequently becoming contaminated in 4 cases.

Two or more of the tubes remained sterile for a month or more in 6 cases.

We then repeated this experiment with two more cases, but in each of these two cases we took two sterile test tubes of urine and to one tube added two drops of blood taken from the vein of the patient at the same time. Two drops of blood from each patient were also placed in tubes of citrate saline, so that there were three tubes from each of these two patients. The deposit from each of these three tubes was inoculated into each of three tubes of N.N.N. medium.

The following results were obtained:—

	1st case.	2nd case.
Urine only :—	Sterile, no flagellates.	Contaminated
Urine plus blood :—	A rich culture of flagellates.	"
Blood in citrate saline :—	A rich culture of flagellates.	"

The examination was made after 9 days incubation.

Conclusion.

Our previous failure in 6 cases, our present failure in 11 cases, in which the flagellates had a reasonable chance of development, and Shortt's* negative results make it clear that as a general rule a viable form of the parasite is not present in the urine of a kala-azar patient.

Under special circumstances the parasites may be present, but they are present only in the cellular deposit that has found its way into the urine on account of some pathological condition of the urinary tract. One example of such a condition can be imitated by the addition of a few drops of peripheral blood to the urine in vitro. The fact that the parasite is recoverable from the urine when this has been done shows that urine does not destroy the parasites and further that the accident of an abrasion to the mucous membrane of the bladder or other part of the urinary tract, by scratching by oxalate crystals or through some other cause, could allow the escape of a viable form of the parasite into the urine.

We do not think that this accident can possibly have any connection whatsoever with the epidemiology of the disease.

The atypical type of the disease referred to by Shortt, in which the liver and spleen are *not* enlarged is by no means uncommon and forms from 1 to 2 per cent. of the general kala-azar outpatient attendance at the Calcutta School of Tropical Medicine, but it is probable that the condition is much commoner than these figures suggest. The lay public and even the medical profession associate kala-azar with a condition of enlargement of the spleen and liver, and it is natural that when these conditions are absent kala-azar is not suspected and consequently the patients do not come for treatment for this disease.

There are advanced cases of kala-azar with very large spleens, others with slightly enlarged spleens, yet others with no apparent enlargement of the spleen but enlargement of the liver and finally cases without either apparent enlargement of the spleen or liver. As these conditions of enlargement or otherwise of the spleen and liver are not associated with any other special signs and symptoms except those that are directly dependent on the enlargement of these two organs, and as all the intermediate stages of these conditions are seen, one does not seem justified in classifying them into four distinct types and certainly not in suggesting that there can be any distinction in the etiology of these types.

It is of course possible that in cases where the liver and spleen are unaffected by the disease, the kidneys bear the brunt of the attack and there is consequently not only more cellular deposit in the urine but this deposit is more highly infected with leishmania.

The discrepancy between our findings and those of Shortt can probably be accounted for by the fact that he centrifuged the urine, a procedure which we, working in the plains in the hot weather, find impossible in the interests of sterility, and thereby obtained a deposit rich in cellular elements. If this explanation is accepted our contention is further emphasised.

Our thanks are due to Major R. Knowles, I.M.S., Calcutta School of Tropical Medicine, for permitting the junior writer to co-operate in this small investigation.

*We assume that he did not make an isolated experiment.

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