THE TREATMENT OF LOBAR PNEUMONIA WITH INTRAVENOUS INJECTIONS OF ALCOHOL

By ILAHI BAKHSH, M.D. (Lond.), M.R.C.P. (Lond.)
CAPTAIN, I.M.S.

and
A. T. ANDREASEN, M.R.C.S. (Eng.)
CAPTAIN, I.M.S.

Indian Military Hospital, Jhelum, Punjab

THE treatment of lobar pneumonia still remains a difficult problem in spite of the hordes of research workers toiling devotedly in this field all over the world.

So far, the sheet-anchor of the pneumonic patient has been good nursing and rest, drugs having persistently failed us. It is gratifying* to know that digitalis is so little used nowadays by the modern physician to combat heart failure in pneumonia. Morphia is still a great friend of the physician but must be used cautiously; its administration after the third or fourth day of the disease is the surest means of hastening a fatal issue.

Oxygen therapy has been advocated for the relief of cyanosis, and various methods of administration, including elaborate oxygen tents, have been invented, but one doubts its material benefit once the cyanosis is marked. Even its early administration, when the cyanosis is very slight, has not reduced the mortality appreciably in our experience. Those who have any experience in pneumonia know how futile all these measures prove once a patient starts going down hill.

Anti-pneumococcal serum has not given the good results at one time expected of it, and the expense entailed in its preparation forbids its general use. Recent work by Sutcliff and Finland (1934) shows the application of specific serum therapy to pneumonia to be even more limited than was previously supposed. These authors state that serum can only be employed to any purpose in one out of ten cases suspected of pneumonia.

Modern research has therefore utterly failed to solve this difficult problem, and to give the physician a weapon wherewith to combat this dreaded disease. For most of us the issue depends upon good nursing and the hope that no complication will occur.

The oral administration of alcohol in the treatment of pneumonia has been practised since time immemorial. Medical opinions still differ as to its efficacy. While we do not hesitate to give small doses of brandy or champagne to a case of failing heart we believe that the routine administration of alcohol in pneumonia, although rendering the restless patient momentarily peaceful, does more harm than good by

* [Note.—At the risk of disappointing our contributors we feel that we must point out that, despite recent criticism of the use of digitalis in pneumonia, there are still many excellent physicians who still use digitalis in pneumonia and consider it of great value.
EDITOR, I. M. G.]

lowering his resistance on account of its specific action on the liver cells.

Intravenous alcohol has been used by various European physicians in a variety of diseases, such as cancer of the lungs, puerperal sepsis, subacute endocarditis, but it was Landau, Feigin and Bauer (1931) who first used it in pulmonary suppurations. Their theory was that intravenous alcohol, instead of being taken up by the liver cells and detoxicated, as in oral administration, went straight to the right side of the heart from whence it was taken by the pulmonary circulation to the lungs. The curative effect of alcohol in their cases of post-pneumonic pulmonary suppuration was due, in their opinion, to the selective affinity of alcohol for the reticulo-endothelial cells in the pulmonary tissue, where it exerted its bactericidal power. They gave small doses of insulin to protect the liver from any damage which might be done by an overflow of alcohol from the pulmonary circulation.

We first tried this treatment on a case of pulmonary abscess complicating pneumonia, and the result was so satisfactory that we were curious to know what effect intravenous alcohol would have on an uncomplicated case of lobar pneumonia. We believe that this is an experiment hitherto untried by any other workers.

Technique of injections

We employed, in the cases quoted, a solution of 20 per cent alcohol in sterile normal saline. The dose used varied from 20 c.cm. to 25 c.cm. per day, in the average-sized patient. We later found that the strength of the solution could be increased to 33 per cent without causing any more reaction than previously. In only one case did we have to give two injections of 12 c.cm. and 10 c.cm. per day on account of constant rigors which single doses of 20 c.cm. produced. In all the other cases the reaction to the injection was slight, and limited to a feeling of chilliness about 20 minutes to three-quarters of an hour after the injection.

Subcutaneous infiltration due to faulty technique in puncturing the vein produced momentary pain running up the arm. Slight induration without suppuration at the site of injection was the only sequel we observed when by mischance the needle either slipped out of the vein or transfixed it.

Case records

Case 1.—G. H., recruit, aged 18, admitted for pain in the right chest, cough and fever of one day's duration.

Condition on admission.—Temperature—101°F., pulse—102, respiration—24, general condition good, *alae nasi* working. Cyanosis—nil. Lungs—impaired percussion note over the back of the right lower lobe with pleuritic rub over the eighth rib in the right mid-axillary line, with diminished air entry, broncho-vesicular breathing and sub-crepitant rales. Sputum—tenacious and rusty.

Treatment.—Saline aperient, Dover's powder at night for the first three days. Cataplasma to the chest and sedative expectorant mixture.

17th February, 1935.—Crisis occurred. Temperature remained normal until 21st February, when it rose to 102.4°F. The white blood count was 20,000.

22nd February. Temperature—104°F., complained of pain in the right chest. Examination revealed dullness on percussion with diminished vocal fremitus and distant breath and voice sounds localized over the right lower chest. Heart not displaced. The patient looked very ill. The white blood cells had risen to 23,000. Later in the evening he had a severe fit of coughing and brought up 1½ pints of greenish evil-smelling material, mostly pus. The condition was, therefore, one of a pulmonary abscess pressing on the right lower bronchus, thus accounting for the peculiar signs found.

23rd February. Temperature—100.2°F., great improvement in the general condition; white blood cells—16,000.

28th February. Temperature again rose to 103°F.

2nd March. In the interval the temperature had been irregular; in the morning, patient had another fit of coughing and six ounces of pus was coughed up. The temperature went down to 99°F. the same evening but rose to 101°F. the next day.

9th March. It was decided to try intravenous alcohol. The man's condition was now very poor, he having had irregular temperatures up to 104°F. and two rigors in the interval since 3rd March. Fifteen minutes after the injection of alcohol, the patient complained of feeling cold. Seen an hour later, he was very comfortable and said he felt much better. He had no cough.

10th March. Injection repeated.

11th March. Temperature has ceased to swing since the first injection of alcohol, and has steadily dropped until it is now normal. From this date the patient made a rapid and uneventful recovery.

Case 2.—M. A., Sepoy, aged 23, admitted on 21st March, 1935, with pain in the right chest, cough and fever of one day's duration. Temperature—99.5°F.,

Case 2, Sepoy, M. A. Admitted 21st March, 1935.
Lobar pneumonia rt.

pulse—88, respiration—22, general condition—good, cyanosis—nil; dyspnoea slight; sputum semi-viscid and scanty but not rusty. Pneumococci present in large numbers. Signs of early pneumonic congestion in

the right lower lobe and pleuritic rub over the ninth to tenth rib in the right mid-axillary line. White blood cells—8,500 (poly. 76 per cent, lympho. 22 per cent, l. mono. 2 per cent, eosin. 0). Treated with cataplasma over the right lower chest, Dover's powder and fluids *ad lib*.

23rd March. Temperature—104.8°F. with all the signs of consolidation, rusty sputum and increase in the chest pain.

25th March. White blood cells—10,500.

Treatment.—Twenty-two cubic centimetres of 20 per cent alcohol solution were given intravenously at 10 a.m. Slight coughing during the injection and feeling of chilliness 30 minutes later. The temperature came down to 101.5°F. the same evening with great relief in the sense of oppression and distress.

25th March. Alcohol injection given. Slept well that night. White blood cells—12,800.

26th March. Temperature came down to normal the same night. Resolution was completed within the next two days. Discharged fit on 6th April.

Case 3.—H. M., a cook, aged 30. Acute onset with pain in the right chest—cough and fever on 5th April, 1935. General condition poor; asthenic type; *alæ nasi*

Case 3, cook, H. M. Admitted 6th April, 1935.
Lobar pneumonia rt.

working; cyanosis slight; dyspnoea moderate; diminished respiratory movements with impaired percussion note over the right lower lobe. Air entry diminished, breath sounds broncho-vesicular, some subcrepitant râles audible over the front and back of this area; sputum scanty and frothy; pneumococci in large numbers. Accentuation of the second pulmonary heart sound, otherwise normal. White blood cells—13,600 (poly. 78 per cent, lympho. 20 per cent, l. mono. 2 per cent, eosin. 0). Blood slide for malaria parasites negative.

Treatment.—6th April. Twenty-two cubic centimetres of 20 per cent alcohol injected intravenously. There was a mild fit of coughing during injection; three-quarters of an hour later slight rigor which was relieved by hot water bottles. The temperature rose to 103°F. but the pain in the chest disappeared. The patient very soon fell asleep. Dover's powder, grains 10, given at night.

7th April. Twenty-two cubic centimetres of 20 per cent alcohol repeated again followed by slight rigor with subsequent improvement in general condition and marked decrease in chest pain. Physical signs in the lungs, however, remained unchanged. Sputum had by now become thin and clear. Injections of alcohol were given daily with progressive improvement in general condition and subjective symptoms, but without much effect on the temperature.

9th April. White blood cells—12,000, without any change in proportions of the different cells.

12th April (sixth day of the disease). Temperature—100.8°F., pulse—78, regular and of good volume; respiration—24, no distress. Physical signs still remain those of early congestion. It was difficult to believe that the case was one of pneumonia on the sixth day.

12th April. White blood cells—12,200.

13th April. Crisis occurred in the afternoon, the temperature dropping to normal within twelve hours, and remained normal. The patient made a rapid and uneventful recovery. Resolution of the lung condition was complete by 16th April.

Case 4.—K. K., Sepoy, aged 30. Sudden onset on 10th April, 1935, with painful cough, pain in the right side and fever.

Case 4, Sepoy, K. K. Admitted 11th April, 1935.
Lobar pneumonia rt.

11th April. Admitted with moderate dyspnoea; no cyanosis, active alae nasi and herpes labialis. The signs in the lungs were those of pneumonic congestion with audible pleuritic rub. Sputum was thick, scanty, and rusty; pneumococci present in large numbers. There was accentuation and reduplication of the second pulmonary heart sound. Other systems normal. The white blood cell count was 16,000 (poly. 76 per cent, lympho. 22 per cent, l. mono. 1 per cent, eosin. 1 per cent).

11th April. Treatment with alcohol commenced. It was found that after his daily injection of 22 c.cm. he had a rigor with rise of temperature and complained of pain along the arm during the injection. This pain disappeared immediately on cessation of the injection. Later, on account of the persistent rigors, the dose was divided into two injections of 12 c.cm. and 10 c.cm. respectively, given one in the morning, and one in the evening on each day. By this means the full dose was given without any reaction. The patient was of the

neurotic type with a low threshold for pain, but he was emphatic about the beneficial effect of the injections, and when it was proposed to stop the treatment on account of the reaction produced, it was he who asked us to continue at any cost. Although the temperature was not much affected, there was a moderate reduction in the pulse and respiration rates. The process of consolidation was arrested except for a patch 2 inches by 3 inches on the back of the right lower lobe.

15th April. The above-mentioned patch of consolidation appeared for the first time during the course of the disease. The sputum, however, was now thin and clear and the pain in the chest had been absent for three days. White blood cells—12,000.

16th April. The patient had a bad night with slight delirium.

17th April. The pain reappeared on the back of the lower part of the involved lobe but the physical signs were entirely negative.

18th April. The temperature began to drop slowly with further amelioration in general symptoms and disappearance of delirium. White blood cells—8,200.

19th April. Crisis occurred shortly after the last of his two daily injections. From this point on the patient rapidly recovered.

Case 5.—G. M., Sepoy, aged 22. Sudden onset with severe abdominal pain on the morning of 29th April, 1935. Temperature—102°F., pulse—100, respiration—30. Abdomen showed no distension nor any rigidity.

Case 5, Sepoy, G. M. Admitted 29th April, 1935.
Lobar pneumonia rt.

Pain chiefly in left upper quadrant where slight local tenderness and hyperaesthesia were elicited; slight impairment, over the back of the left lower lobe of the lungs, of the percussion note and air entry; no other physical signs. Enema produced a good result, and a hot water bottle for the abdomen relieved the pain.

30th April. The patient developed vomiting with diarrhoea. The stools contained no blood or mucus. Atropine 1/100 gr. and morphia 1/6 gr. given. The vomiting and diarrhoea ceased. The lungs now showed definite signs of consolidation over a small area,

2½ inches by 1½ inches over the back of the left lower lobe. Painful cough had developed with rusty sputum containing numbers of pneumococci. Alæ nasi working with slight dyspnoea; no cyanosis; white blood cell count 12,600 (poly. 78 per cent, lympho. 18 per cent, l. mono. 3 per cent, eosin. 1 per cent).

Treatment.—Twenty-one cubic centimetres of 20 per cent alcohol solution injected intravenously. Some coughing occurred during the administration of the alcohol, but a few minutes later the patient said that the pain had gone from his chest and he was feeling sleepy. On waking an hour later, the patient had no pain in either abdomen or chest, and his cough was markedly less irritating. The patient slept well that night.

1st May. Twenty-two cubic centimetres of 33 per cent alcohol solution administered. A slight rigor took place 20 minutes later. The patient had an excellent night.

2nd May. Lung signs remained unchanged, without any increase in the area of consolidation previously mentioned. The injection of alcohol (33 per cent) was repeated. The rigor was this time very slight. The physical signs diminishing; previous patch of consolidation is now occupied entirely by râles, and the breath sounds are becoming vesicular.

3rd May. The patient himself asked for his injection this morning, stating that he wished the injections continued as he felt so much better after the previous one. The injection was repeated.

4th May. The condition much improved, dyspnoea has disappeared. The signs of consolidation and râles have now completely disappeared. There is no cough or sputum. Injections continued daily with further improvement in the general condition. White blood cells—10,400.

6th May. The temperature rose only to 99°F.

8th May. The temperature normal. The patient sitting up with no signs in the chest or abdomen.

A rapid and uneventful convalescence followed.

Case 6.—R. S., Sepoy, aged 18. Admitted on 16th May, 1935. Sudden onset of pain in right chest twelve hours previously with cough and fever. Temperature—104°F., pulse—120, respiration—30. General condition good. Dyspnoea moderate; no cyanosis; signs of early pneumonic congestion in right lower lobe of lung; cough dry and painful without sputum. No apparent abnormality in the heart. Urine:—acid, specific gravity 1025, albumin ++, deposit containing a few white blood corpuscles and red blood corpuscles with some granular casts; no sugar or other abnormality present. Blood slide for malarial parasites negative. White blood cells—27,000 (poly. 75 per cent, lympho. 20 per cent, l. mono. 3 per cent, eosin. 2 per cent). Total red blood cells 4,287,500, hæmoglobin 80 per cent, colour index 0.9. Symptomatic treatment was instituted.

18th May. Condition the same. Sputum rusty, thick and tenacious.

19th May. Chest pain worse, cyanosis evident, signs of consolidation have appeared over the back of the right lung; character of the urine unchanged.

Treatment.—Injection of alcohol (20 c.cm. of 33 per cent) commenced. Slight coughing occurred during the injection but no rigor. The effect was dramatic, the pain in the chest disappearing and the patient falling soundly asleep within two hours of the injection. He had a peaceful night with a good deal less dyspnoea.

21st May. Cough and sputum practically negligible. Urine total quantity 29 ounces, alkaline, specific gravity 1031, albumin nil, casts a few, number very much decreased. No red blood nor white blood corpuscles. Injections of alcohol continued daily without any reaction such as rigors or coughing.

22nd May. Sleeping well and feeling well with very little cough. Lung signs remained unchanged. White blood cells—12,400. The albumin reappeared in the urine in very slight quantity, but no other abnormal content.

23rd May. Crisis occurred with further improvement in the general condition.

24th May. Urine clear of albumin.

Case 6, Sepoy, R. S. Admitted 16th May, 1935.
Lobar pneumonia rt.

25th May. A slight rising of temperature to 99.4°F. but the progress otherwise very satisfactory.

26th May. Resolution is rapidly taking place. From this date on no more injections were given, and convalescence was rapid and uneventful.

Discussion

The first case, one of pulmonary abscess, is included in this paper because it was our first case in which intravenous alcohol was tried. The results were so encouraging in a case which was clinically in a very bad condition that we were of opinion that perhaps, by early institution of alcohol treatment in all cases of pneumonia, we might avoid many of the complications of this disease.

In connection with the subject of alcohol intravenously administered in pneumonia, one of us (A.) calls to mind a case of double pneumonia, treated last year. The patient had arrived at its eleventh day with consolidation present in both lungs with bubbling râles, temperature—104°F., pulse—130, irregular and of low tension, respiration—55, cyanosis marked with cold sweating extremities, with no signs of a crisis or resolution by lysis being about to take place. All the signs of impending dissolution were present; the patient was severely toxic, and delirium had been present for three days. The urgent question of treating the patient had

to be faced. An intravenous injection of glucose 10 per cent and brandy half an ounce in about 50 c.cm. of sterile normal saline was given twice during the eleventh day, and once on the twelfth and thirteenth days. The effect, which we at that time ascribed to the food value of the injection, was dramatic. The patient became quiet, the respiratory distress was relieved and, after a slight rigor, the temperature began to fall, and continued to fall until it reached normal on the thirteenth morning. The patient had, by this time, quite regained his normal mental state and from then on made a good recovery.

We now think, in view of the six cases quoted above, that the beneficial effect of the injection in this apparently hopeless case was due not to the food value so much as to the specific action of the alcohol.

We think the following points worthy of note. Some of these are difficult to describe on paper but were so striking clinically that they must be recorded.

(a) *Pain*.—Within an hour of the injection, in every case, there was sufficient decrease in the intensity of the pain in the chest to allow the patient to sleep comfortably. It had completely disappeared within 48 to 72 hours of the first injection.

(b) *Cough*.—After slight stimulation during the injection in some cases, there was steady decrease in the coughing. This was accompanied by a change in the character of the sputum. There was a decrease in the amount and a change from thick, rusty, pneumonic sputum to clear non-viscid watery matter within two to three days of the first injection. In those cases where injection was begun before the sputum had become rusty, it never developed this character, but very soon became watery and easy to eject.

(c) *Dyspnoea and cyanosis*.—Cyanosis remained entirely insignificant throughout the course of the disease in those cases where the injections were commenced from the first or second day of disease. In the majority of cases, the respiration rate was lowered and the dyspnoea much reduced.

(d) *Pulse rate*.—The pulse rate was slightly lowered and, in case 3, it remained surprisingly low considering the temperature, rarely rising above 88 for a temperature of 102°F. In case 6, which was complicated by acute nephritis and the treatment with alcohol was not commenced until the fifth day, the pulse remained well below the 110 level after that day.

(e) *Temperature*.—There was a rise of temperature more or less, after each injection, the rise being less and less as the patient's condition improved. It was remarkable, however, that the temperature remained raised until the crisis occurred at the eighth or ninth day, just as in an untreated case of pneumonia, although perhaps the general height of the temperature

was not so high as it would have been otherwise.

(f) *Consolidation*.—Arrest of the process of consolidation in those cases treated from the start of the disease was a most remarkable and outstanding feature. The congestive stage gradually regressed, so that by the time the crisis occurred the involved lobe was almost free from any signs of pneumonia. In cases 2 and 6, where alcohol was not commenced until the fifth day of the disease and where consolidation had already set in, the rapid resolution was noteworthy. Resolution in a non-alcohol-treated case takes from 12 to 15 days to be completed, whereas in these cases it was complete before the second day after the crisis.

(g) *The leucocyte count*.—Except in case 2, where the count rose from 8,500 to 12,800 after the first injection, there was a gradual decrease running parallel with the regression of the lung signs and the improvement in the general condition of the patient.

(h) *Course of the disease*.—In cases 2 and 6, where the injection was given on the fifth day of the disease, the crisis occurred on the eighth and ninth days, respectively. In cases 3, 4 and 5, the injections were commenced on the second day of the disease and the crisis occurred on the 8th, 9th and 8th days, respectively. Thus the course of the disease, from the rise of temperature on the first day to the fall on the eighth or ninth day by crisis, was the same in cases treated with alcohol, in those partially treated with alcohol, and in those not treated at all by alcohol. The complications, i.e., lung abscess and acute nephritis, were beneficially affected by the alcohol.

(i) The subjective condition of the patient was immediately changed from that of the acute distress of the pneumonic patient to one of ease and sleep. The patients themselves so felt the benefit of the injections that they themselves asked for their injections, looking forward to the relief which always followed each injection and which increased from day to day.

Although no conclusion can be drawn or hypotheses offered we feel that we have to hand a new method for the treatment of pneumonia worthy of further investigation and trial.

As cases occur so we are continuing our investigations and hope that in the near future we shall have available necessary arrangements in order that certain collateral laboratory investigations may be undertaken.

The above treatment is now being applied by one of us to post-anæsthetic and post-operative lung complications.

Summary

A new method of treatment for pneumonia is put forward, six cases are described, and the effect of intravenous alcohol, as observed in these cases, is discussed.

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ATEBRIN TREATMENT IN MALARIA

By D. C. HAY, M.R.C.S., L.R.C.P.

A. E. SPAAR, F.R.C.S. (Edin.)

and

H. L. LUDOVICI, L.R.C.P. & S., L.S.T.M.

Kandy

As medical practitioners who have used the new synthetic drug, atebirin, in the treatment of malaria, both parenterally and orally, since January this year, we feel we would be doing a service to the public, and to the profession, by reporting our experiences with it.

We have a large outdoor practice, both amongst villagers and town residents: in the former case, we are not able to follow up all our treatments, but we receive confirmation of the good results of the atebirin treatment, from the attendances at the dispensary and requests for injections of the drug, from villagers coming from the same locality as those who have already been treated. In the case of town patients, and pupils of colleges and schools, we keep in touch with them all, and are able to confirm the good results that have followed.

In other cases, where we cannot maintain personal contact ourselves, we have the statements of friends of our patients, so that, on the whole, we exercise a certain amount of control over as large a number of cases as private practitioners can hope to do.

Since January this year we have treated over 3,500 cases by injection with atebirin di-hydrochloride, or atebirin musonate. In this series we have not had a single case of collapse after injection, and no deaths attributable to the drug. Cases of mental excitability after treatment with the drug have been extremely rare, about five per thousand. In such cases the condition is readily controlled by sedatives, such as the bromides and chloral, and eliminants such as citrate of potash, combined with glucose administration; but in view of the fact that we have seen mental excitability approaching insanity, as a result of malaria, in cases which have had neither atebirin nor quinine, we cannot solely attribute this symptom to the use of atebirin. Occasionally, patients complain of

bad headaches after the drug, also restlessness and insomnia following the first injection, which symptoms disappear after the second injection. In a few instances, we have noticed plentiful crops of sudamina with itching of the skin, all of very temporary duration, till satisfactory excretion of the drug takes place, as evidenced by the discoloration of the urine. Instances of irritability of the stomach and vomiting of bile have occurred after oral treatment, but this we cannot put down to the use of atebirin, as these disabilities arise in cases of malaria treated with other drugs, or in untreated cases, in forms known as the 'bilious remittent', and algid types. We are of opinion from our prolonged use of atebirin, that any temporary disabilities, such as we have mentioned, are more than counter-balanced by the dramatic results obtained from its use. In our experience both salts have proved extremely efficacious, but we have used somewhat smaller doses than those advocated, and in all cases we have supplemented the parenteral treatment with subsequent oral administration.

As to dosage, we use for male adults injections of 0.15 gramme of the di-hydrochloride, and repeat this dose in 24 hours. This is followed by oral treatment of two tablets a day for six days, bringing the total of atebirin administered to 22½ grains (1.5 grammes) for the whole course, which is equivalent to a tablet taken three times a day for five days, as recommended by various writers.

In the case of females, or weak and debilitated males, we use two injections of 2½ tablets each of the di-hydrochloride and follow it up with ten tablets orally, two a day for five days. We have found this sufficient in the great majority of cases to prevent relapses. Previously-treated patients do come back at intervals of 5 or 6 weeks with a return of temperature but in view of the fact that they reside in heavily-infected localities, the probabilities are that they have been re-infected. It is not possible to make blood examinations of all cases in a dispensary practice, but we have often followed up our injection treatment by examining blood films after the second injection. We have rarely seen any ring forms after the third or fourth day and any such appeared in fragmentation, of quarter and half rings. After the fifth day, even after an excitant injection such as adrenalin, we have failed to discover parasites in the blood.

Blazé and Simeons, in their paper in the April number of the *Indian Medical Gazette*, assess the curative dose at 9 grains (0.6 gramme) and while this may be perfectly correct from the view-point of mass treatment, it would not appear to meet the needs of private practitioners in our position. In nearly all the instances in which we have given the drug in the doses prescribed by these writers, we have had our patients coming back after 10 to 14

(Continued from previous page)

The main effects are:—

Pain and cough are immediately relieved.

The consolidation is arrested and regresses.

The patient's distress vanishes and he sleeps well, and

The 'defences' of the body are apparently not interfered with.

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