

## 4. Blood for the lungs

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After Hasse's promising results, doctors across Europe and the USA wanted to experiment with lamb blood transfusion on very sick tuberculosis patients. In this chapter we meet physicians, patients and some lamb, learn how to conduct a transfusion, and note its dramatic immediate effects. But was it beneficial in the long run?

It is late August 1874. The season at Mösseberg Spa in southwest Sweden is almost over. Guests are leaving after a summer of invigorating walks in the neighbouring hills and baths in the spa's clear calciferous water. Soon, the birch trees in the park will turn yellow.

Mösseberg's stately main building has just been rebuilt after a devastating fire a couple of years before. The spa mainly attracts a well-to-do clientele but also has a small hospital for poor patients, paid for by donations. In charge is an ambitious young physician, Otto Torstensson. He is eager to try new treatments on the spa's guests, many of whom suffer from lung diseases, most notably tuberculosis, then also called consumption or phthisis pulmonaris. Torstensson recommends inhalation of 'medical vapours', the use of Professor Waldenburg's pneumatic apparatus to enhance respiration, an assortment of thermal baths, electricity therapy and, of course, lots of fresh air.<sup>1</sup>

Recently, news of a possible miracle cure has reached him from the continent: blood transfusion with lamb's blood. Now he wants to try it. A young woman suffering from phthisis is scheduled to undergo the procedure, but she dies on the very morning it was to be performed. Some days later, a new opportunity presents itself.

The farmhand, Carl Jacobsson from Kyrkefalla in Västergötland, 26 years of age, has suffered from general weakness since his childhood. During spring 1874, he became weaker, paled considerably and grew even thinner. He spent three weeks at Medevi Spa without getting any better and upon his return home began to suffer from a persistent cough, had difficulties breathing and was soon so weak that he had to stay in bed all the time. On August 19, he was taken to Mösseberg and found to be afflicted with a complete thickening of the lower lobe of his left lung and peribronchitis of his right lung. He was extremely pale and thin, with no appetite, could not move without support, suffered from fever and night sweat. His pulse was very weak and rapid.<sup>2</sup>

The season is late and there is not enough time for the usual treatments. But the patient's condition, caused by chronic pneumonia or perhaps tuberculosis, is critical and Torstensson decides to try a transfusion. 'I was very keen to make a lamb blood transfusion, for which I had during spring obtained the necessary instruments from Dr HASSE in Nordhausen by Harz', he later reports in a Swedish medical journal.<sup>3</sup> Said and done, a transfusion is performed. It is the very first in Sweden using blood from a lamb and it is deemed a success!

The day after the operation, the patient declares that he feels really well. He eats with a good appetite and soon goes for walks in the fresh air, without any support. After five days, the doctors cannot retain him any longer at Mösseberg and he leaves for home. Five weeks later, Torstensson gets a letter from the patient, where he reports that he is 'so much stronger and has been able to walk several kilometres without any inconvenience; he still, however, has a persistent cough'.<sup>4</sup> When Torstensson meets him in September 1875, a year after the operation, he is 'still healthy and in good shape'.<sup>5</sup>

Encouraged by the good results, Torstensson and colleagues make a second transfusion in November 1874 at the nearby hospital in Falköping, this time on a very sick phthisis patient, a young notary. He seems to recover but then falls into a depression when his mother dies. He leaves the hospital and no more is known about his fate.<sup>6</sup>

## Consumption challenges

Phthisis, tuberculosis and consumption – the nomenclature varied and there was no agreement on whether it should be considered one disease or sev-

eral – was the single most important cause of death in the mid-19<sup>th</sup> century. Death rates in major cities in Europe and the US were between 800 and 1,000 per 100,000 inhabitants per year.<sup>7</sup> The course of the disease was unpredictable; most victims deteriorated gradually. At its later stages, patients coughed blood, had chest pains, lost weight, became feverish and extremely tired; many would soon succumb. Overcrowded dwellings, malnutrition and lack of care made it a disease of the poor. Many hospitals would not admit them as patients, seeing them as incurable, and many poor families could ill afford to care for the sick when their symptoms became pronounced. It was considered to be a hereditary disease until 1882, when the German scientist Robert Koch demonstrated the existence of the tubercle bacillus. From then on, the disease was seen as contagious, which opened up for preventive measures and the widespread establishment of sanatoria. The death rate would slowly decline.

In 1874, however, physicians like Torstensson, trying to help phthisis patients recover, were years away from such promises. They had an agonising lack of effective remedies; the situation was often without hope. No wonder that they seized upon the news from Germany that lamb blood transfusion was a possible cure for consumption. In early 1874, Oscar Hasse's book had appeared. He there described how he had first transfused five phthisis patients with defibrinated human blood but met with only temporary success. He then made six transfusions with lamb's blood, and now, 'the success was surprising and wonderful. The general health of these patients was soon perfectly satisfactory, and the local symptoms continued to improve steadily'.<sup>8</sup>

The news made quite a stir. Such improvement might otherwise only occur after the patient had spent many winters in a warm, southern climate, away from the cold.<sup>9</sup> This was something many phthisis patients could not afford. A lamb blood transfusion might therefore, as one Swedish observer hoped for, be 'a chance to fight a disease against which we, when it haunts the poorer classes in society, almost always fight in vain'.<sup>10</sup> In a surprisingly short time, doctors across Europe would try out the remedy.

Thus, the good news travelled fast and also reached America, often via resident German doctors. In Addison, Illinois, Dr Hotz expressed enthusiasm but also some doubt:

*A priori*, it is true; we could not understand how the transfused blood was to act upon the pulmonary disease. It did not seem very likely that the simple addition to the blood of a few ounces of fresh lamb's blood, would materi-

ally influence so complicated a trophic disorder as the phthisis is the result of. [On the other hand] we are daily using a great many remedies because by experience we know them to be useful although we cannot comprehend their action fully yet. At present time, we do not decide upon the merits of new therapeutics by theoretical speculations but by experiments.<sup>11</sup>

Hotz and colleagues therefore proceeded to experiment with lamb blood transfusion on severely ill phthisis patients (and some others). They transfused a teacher, a butcher, an opium eater cum tobacco dealer, a blacksmith, and several patients of unknown profession, all during the summer of 1874. Before them, in November 1873, Dr Merkel in Boston had tried lamb blood transfusion on a phthisis patient with some success. Dr Sittel in Cincinnati accounted for several, more or less successful cases in the autumn of 1874, Drs. Hoffman and Weyland of Fall River, Massachusetts, told of one successful case in November 1874 and, somewhat later, Dr Briggars of Elvira, Ohio, reported another happy outcome concerning a patient suffering from the last stage of stonecutter's consumption.<sup>12</sup> Half a dozen other cases were reported in US newspapers, some claiming positive immediate results, others ending less well.<sup>13</sup>

But it was in Europe, most notably Germany, that Hasse's influence would be the greatest. Dr Sander in Barmen transfused a saddler, a tailor and some other workers afflicted with lung disease, though with mixed results – some patients seemed to get better but one died.<sup>14</sup> The German doctor Oscar Heyfelder in St. Petersburg tried the therapy on two women with serious phthisis, of which one recovered. The second patient felt better, but then she 'put aside all rules of carefulness to walk in the midday heat and dust on the Newsky Prospect', got worse and died on June 11.<sup>15</sup> Other doctors who performed lamb blood transfusion on phthisis patients were Flemming in Gadebusch, Schliep and Küster in Berlin, Warfvinge in Stockholm, Brügelmann in Cologne, Thurn in Niederrad, Neudörfer in Vienna, Schmidt in Lahr, Klingelhöffer in Mainz and Molitor in Karlsruhe, to name but a few of those who described their experiences in the medical journals of the time.<sup>16</sup>

They, and others, transfused lamb blood also to patients with other serious afflictions: typhus, anaemia, cancer and leukaemia. Interestingly, the previously dominant usage of blood transfusion – to women suffering from post-partum haemorrhage and gynaecological ailments – was almost entirely absent when it came to lamb blood transfusion. Perhaps there was not enough time to procure and prepare a lamb in the acute case of severe post-partum

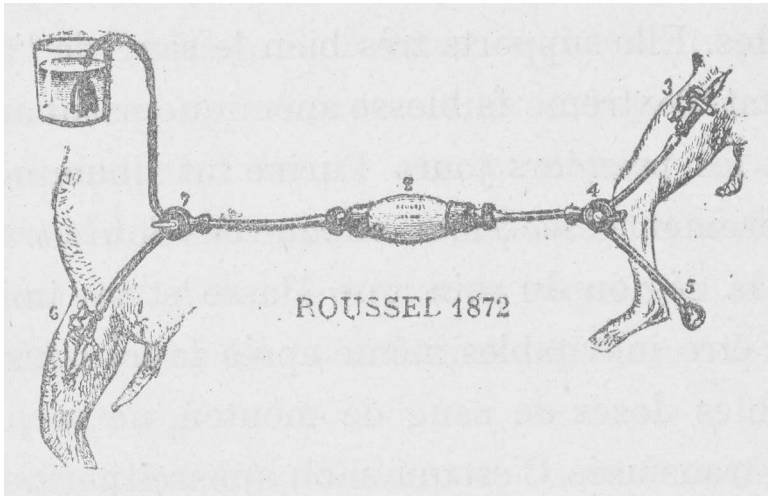


Figure 13. Roussel's modified apparatus used for a vein-to-vein transfusion of lamb blood in the St. Petersburg contest of 1874 (Roussel 1885, 23). It is not clear why the number 1872 is present in the image.

haemorrhage? Or was it seen as dangerous and improper to introduce an animal into the birthing chamber?

By 1874, nevertheless, some British obstetricians, pioneers in the use of transfusion, did consider the use of lamb blood in such circumstances. A couple of years before, the Obstetrical Society of London had formed a special committee to deliberate on the bewildering varieties of transfusion instruments and on the use of whole versus defibrinated blood. Now the committee also discussed animal blood.<sup>17</sup> On April 29, 1874, the well-known obstetrician, James Hobson Aveling, performed the first lamb blood transfusion in England. It was made at the Chelsea Hospital for Women to a woman suffering from a retroverted gravid uterus, but the woman died. Still, Aveling thought that Albini's and Hasse's examples had shown that, when no human blood was available, 'lamb's blood should without hesitation be used'.<sup>18</sup> But there was to be only one more lamb blood transfusion in Great Britain, this time to a haemorrhaging patient at the German hospital at Dalston and from a lamb 'that happened to be on the premises'.<sup>19</sup>

On the continent, on the other hand, transfusion had moved from being a tool used almost exclusively by obstetricians and surgeons to being attempted (now with the blood from lamb) as a general medical therapy. It was used in serious, but not acutely life-threatening, situations, where there seemed to be enough time to procure and prepare a lamb for transfusion. And the favoured indication was phthisis – a choice with a large public resonance.

Hasse's and others' successful transfusions to phthisis patients soon made the popular press. The Mösseberg case in August 1874 immediately caught the attention of a local newspaper. Several Swedish papers also reported about Dr Ziemssen's possible salvation in an Aachen spa of a woman suffering from consumption: 'A young lamb was the innocent animal that was singled out to infuse new strength with its warm blood into this semi-corpse.'<sup>20</sup> In Dresden, there was an onrush of patients demanding transfusion after positive results had been published in the popular press, thereby compelling the hospital's physicians to try the operation.<sup>21</sup> And a probably invented story made the US press in 1874 and even reached newspapers as far apart as Sweden and New Zealand. It told of a case when blood from a goat, for lack of available human or lamb blood, was transfused into a man suffering from consumption. The effect was dramatic – the man started butting the doctor and others present, brayed like a goat, and did not calm down until he was bled and received a second transfusion, this time from an Irishman. His long-term condition was reported to be good, but he shocked his Republican friends by, like most Irish immigrants, becoming a staunch Democrat.<sup>22</sup>

## The benefits of lamb blood

Two basic arguments were advanced for why lamb blood could be used in transfusion, one physiological and one practical.

Lamb blood was suitable, it was argued, since its blood cells (called corpuscles) were smaller than those of humans. They could therefore easily travel inside human blood vessels. If no lamb was at hand, Gesellius (and others) argued, one could in situations of real need instead use the faithful servant of humankind – a dog! Cats, on the other hand, were not suitable as blood donors since their corpuscles were too large.<sup>23</sup>

A particular advantage of using lamb was the ease with which a direct, oxygen-rich arterial transfusion could be performed. Arterial blood was supposedly more 'alive' than blood from a vein. But to make a direct arterial trans-

fusion from a human being was a dangerous procedure, something that most doctors definitely did not want to try.<sup>24</sup> A direct transfusion from a lamb's artery was a better alternative, especially if one wanted to do repeat transfusions. As to the sometimes violent reactions arising from a lamb blood transfusion (more about them below), they could be avoided, proponents argued, by a careful administration of the procedure. And did not transfusion with human blood sometimes lead to strong reactions, too?<sup>25</sup>

To this was added a practical argument. Human blood donors were fickle, got frightened or excited when they saw blood streaming out of their bodies. More than one human donor had fainted on him, Neudörfer reported.<sup>26</sup> Getting a lamb, preparing it and performing a lamb blood transfusion was considered a more convenient alternative. Actual practice was messier, as we shall see.

## Performing transfusions

I now turn to how physicians described their transfusion experiences at medical meetings and conferences; the patients' versions are, unfortunately, seldom heard. The doctors' reports tell of their patients' desperate condition, their own bewilderment, and their subsequent brave decision to move blood from a lamb to a suffering human being. We learn of their satisfaction when they manage to snatch a patient from the jaws of death and their disappointment at failure despite valiant attempts.

Such case reports were the most important means for clinical physicians to communicate their discoveries to colleagues.<sup>27</sup> The reader (or listener at meetings) was provided with sometimes quite emotional accounts of the patient's suffering, combined with more detached information from percussions and palpations. The reports inform of how the transfusion was carried out and how the patient reacted. They provide pulse and temperature charts and report on the patient's breaths per minute, bowel movements (when, how often, how much) and faeces (is it brown? grey? yellow?), colour and texture of sputum. The amount and colour of urine are reported, sometimes as seen through the microscope to establish the presence of red blood cells and albumen. In only a few cases was the newly invented Malassez method used to count the number of red blood cells before or after the transfusion.<sup>28</sup> Nor was the patient's blood pressure taken since a practical procedure for this purpose had not yet been developed.

The narratives usually begin in a then conventional form. The sick person is situated with regard to social position and gender. His or her name is given, but sometimes only initials, as are age, place of domicile and, often, occupation. At that time, hospitals mainly catered for the poorer segments of society. More well-to-do patients were treated in their homes. Hasse, for example, reported performing transfusions in patients' apartments, in a rectory and at a farm.<sup>29</sup> Many phthisis patients encountered in the case reports were urban workers, but there were also, among others, prostitutes, farmers, a notary, a 'very intelligent school teacher', a bookstore keeper, and officers and soldiers of the Russian, German or Austrian army. The medical histories of parents and siblings are accounted for; many had suffered, and died, from tuberculosis or related diseases.

Having established the need for a transfusion, how then to proceed?

A first necessary step, at least for doctors in private practice, was to get the patient's or the family's permission to transfuse. In most cases, this was an easy task. Hasse reports that patients sometimes begged him for a transfusion or were referred to him explicitly for this purpose. Only in one case, did the family ponder the suggestion for a couple of days. In another, the relatives insisted on a transfusion and the sick person agreed to it only to appease the family.<sup>30</sup>

The next step was to procure a lamb, preferably a young, healthy one of about four to six months. Some physicians found this an easy undertaking, others reported difficulties. Klingelhöffer had a hard time obtaining a lamb and, once he had gotten one, had to be very careful not to bleed it too much, since its owner wanted it back alive.<sup>31</sup> In one case in Sweden, the physician 'tried to find a sheep, but when this was not possible, I obtained blood from two strong fellows'. In another, human blood was resorted to 'since no lamb was at hand'.<sup>32</sup> For Flemming, getting a lamb was no problem in animal-rich Mecklenburg. There were lamb in almost every cottage and even in the small towns, he reported. In larger towns, every butcher could help.<sup>33</sup> But Hasse warned against contacting city butchers – their animals might not be strong enough. Instead, one should cultivate good relations with a competent farmer or shepherd who knew his animals well, had cared for the lamb and its parents, and would handle and transport it in a gentle way.<sup>34</sup> Quite often, the same lamb was used for more than one patient. Mysteriously, the particular breed of lamb was sometimes indicated: an English lamb, a Hungarian lamb, a Merino lamb.



Obtaining the desired *young* lamb was difficult during parts of the year, so some doctors used full-grown sheep instead. This brought an unwanted side effect – the patient would smell oddly after transfusion. The ‘intelligent schoolteacher’ transfused in Addison, Illinois, was ‘haunted’ by a strong odour of lamb for at least three days after the transfusion.<sup>35</sup> Neudörfer thought the smell was an effect of what the sheep ate. A lamb being no herbivore but a milk drinker would have less volatile fatty acid compounds in its blood than a full-grown sheep and thus give off less of a smell. For other reasons, too, a young lamb was to be preferred. It was easier to handle, and its blood did not flow as quickly as that of an older animal; this meant less pressure on the patient’s heart.<sup>36</sup>

Once these preliminaries had been taken care of, the operation could commence. Present at the bedside were often several assistants and interested medical colleagues. They were useful, Hasse argued, since the various steps of a transfusion should follow swiftly upon one another. The assistants could help open the patient’s vein, keep track of time, and steady the lamb during the operation.<sup>37</sup>

We will now follow the detailed account given by the assisting young doctor at Mösseberg, C.H. Björck. It is a story similar to those in most other reports. He first tells of the various implements used. They had perhaps been bought for two thalers from Mechanikus Ockert in Nordhausen, as recommended by Hasse in his book.<sup>38</sup> The apparatus is extremely simple, Björck notes: it consists only of two sets of two and a half inches long glass tubes or cannulas somewhat elongated at one end, two rubber tubes of equal length to fit into the thicker end of the glass tubes, and two brass clips to close the rubber tubes.

Particular attention should be given to the board on which the lamb was to be attached,

[I]t is of utmost importance that it is bound so that it can breathe freely but not be displaced from its position, and its neck move comfortably close to the patient’s elbow joint [...] Thus, you must make the board somewhat broader where the animal’s trunk and legs will rest, and narrow it off at the side where the animal’s neck and head will rest. Furthermore, you should supply the board with several holes to securely attach the rope with which the sheep is to be tied down.<sup>39</sup>

The next step was to prepare the lamb’s artery for the transfusion. Björck describes how this was done at Mösseberg:

Once the lamb had been safely attached to the board, its wool was sheared off near the carotid. A seven cm long incision in the skin uncovered the carotid artery that was then tied up with a ligature. The artery was opened with a small lengthwise cut and the narrow end of one of the glass cannulas was inserted. It had already been attached to the rubber tube and filled with a 1 per cent soda solution. The artery was ligatured to the glass tube and the wound covered with linen patches to prevent coagulation of the blood. The lamb was then left to be carefully guarded by an assistant.

This part of the operation, Björck notes, 'appears to be rather simple [...] however, its practical performance may meet with a number of difficulties'.<sup>40</sup> It is not altogether easy to prepare the lamb's artery, he warns. You risk cutting off the animal's vagus nerve, something that would obstruct its breathing and make it even more restless. Or you might injure the neighbouring *vena jugularis* and cause a major haemorrhage. And even if everything goes fine, it could happen that you, after having made the incision in the carotid, will meet with a rapid torrent of blood that makes the entry of the glass tube difficult. And the pressure of the blood may, even if you have successfully introduced the glass tube and fastened it, push it away again! At every failed attempt blood will be lost. And it is only natural, Björck admits, that the lamb 'makes desperate efforts to liberate itself'.

This, in fact, was what happened at Mösseberg. The successful transfusion to Carl Jacobsson was preceded by a first, failed, attempt a few days earlier. The glass tube was not securely attached, the animal gave a start and blood gushed forward from its artery. The tube was attached again but, once more, slid off the opening in the artery and a stream of blood poured out. At the third attempt, the tube was finally securely fastened but now the animal was so exhausted that it ceased breathing when the transfusion was about to begin, and the operation had to be abandoned. Two days later, it was performed again with a new lamb. This time the transfusion went well.<sup>41</sup>

Given these various difficulties, Björck recommended future transfusionists to first practice on a dead sheep to become well oriented in its anatomy. His advice was taken *ad notam* by another Swedish physician keen to try the therapy: 'The day before the operation I opened up the carotid of a couple of sheep and tried to orient myself in the topography of the animal's neck', he reported.<sup>42</sup> Others made the added precaution of applying a small clamp at the central end (towards the heart) of the lamb's artery to temporarily inter-

rupt the circulation while the artery at the peripheral side (towards the head) was closed by a ligature.<sup>43</sup>

The next step – to prepare the patient's *vena mediana* in the elbow joint – was simpler. For one thing, the vein is just underneath the skin; you therefore have no blood stream to combat, Björck points out. You should just make a small lengthwise incision in the vein, introduce the glass cannula filled with the soda solution into the cut and underbind the vein and the tube with a ligature. This glass tube, too, had a rubber tube attached to its other end, which was closed with a brass clamp. Some doctors reported using local anaesthesia, for example with chloroform, for anxious and sensitive patients. This was probably useful since even trained surgeons would sometimes miss the vein; they then had to try again with often quite painful results.

The transfusion could now begin. Here is Björck again, reporting on how the procedure in Mösseberg was performed: The board with the lamb was brought into the sick room and put on a table close to the patient seated in a comfortable armchair. The clamp was removed from the animal's rubber tube, then a blood stream was allowed to pour out to eliminate possible blood clots. The rubber tube was removed from the patient's glass cannula and the rubber tube from the animal's glass tube was quickly pulled over the patient's cannula. First the soda solution and then the blood from the lamb would pour into the patient.<sup>44</sup> 'This act is, as is easily understood, the most critical moment of the whole operation and demands swiftness and precision', Björck notes.<sup>45</sup>

That the operation was not altogether easy to perform is evident from Torstensson's and Björck's accounts. Others, too, got into trouble. Professor Leube in Jena had studied Hasse's procedure at close hands and thought it simple to perform. Still he got blood clots in the artery cannula and had to change it twice before giving up. Four hours later and with a new lamb, he had problems ligaturing the tube in the animal's artery – it slid hither and thither.<sup>46</sup> Gissler and Wentzel in Pforzheim had to struggle to insert the cannula into the lamb as well as into the patient, and in Boston, Merkel eventually resorted to making an indirect transfusion with defibrinated lamb's blood.<sup>47</sup> Some transfusionists substituted one long glass tube for the rubber tubing and two cannulas, others used a silver cannula for the vein since they feared a glass cannula would break in a sudden movement, still others used a modification of Roussel's apparatus or an instrument invented by the German doctor Schliep that resembled an English stomach pump.

To calm the lamb, Heyfelder took care to wrap a scarf around its head to cover its eyes but leave the mouth free.<sup>48</sup> A US doctor transported the lamb securely enclosed in a sack.<sup>49</sup> Others sedated the animal with chloroform or chloral hydrate, in which case there was no need to strap it to a board. One physician thought it more pleasant for the animal just to have its legs tied together and an assistant keeping it calm by laying his hand on its head. Then, he reported, the lamb behaved with a truly lamblike patience – it was calm and breathed normally during all steps of the operation.<sup>50</sup>



Figure 14. A lamb blood transfusion according to Hasse (Hasse 1874a, inside cover page).

## Experiencing lamb blood transfusion

The occasion was not as serene for the transfused patients, however. Their breathing, pulse, temperature and much else were often violently affected. As Dr Roelen in Düren summarized the situation: ‘The animal is jolly at once [after the transfusion], but the patient is a piteous sight.’<sup>51</sup>

Here is what happened to Carl Jacobsson at Mösseberg Spa:

After about a minute, his right cheek turned red, his lips blue and the formerly calm patient got very anxious with sweat beads across his brow and difficulties to breathe. He then complained of a terrible backache and a heaviness across the breast. When his symptoms worsened, it seemed best to discontinue the operation. It had by then gone on for slightly more than two minutes.<sup>52</sup>

Hasse recommended to stop the transfusion when the patient complained of difficulties breathing. In the cases reported, this meant after between thirty seconds and three minutes, and most often on the insistent demand of the patient, as in these examples from Sweden:

Towards the end of the transfusion, the patient's cheeks blushed strongly. She was restless and finally screamed out aloud that she could not take it anymore.<sup>53</sup>

The patient soon started to cry about a pain in her lower back, about a pressure over the breast and finally said, 'I think I'll die'. Then the blood stream was discontinued, the cannula removed from the vein, champagne and nerve drops administered.<sup>54</sup>

Accounts from elsewhere tell a similar story of 'extreme agitation, dyspnoea bordering on asphyxia, heightened face and skin colour, bloodshot conjunctiva, cold sweat, strong cyanosis; the patient thinks he will suffocate and makes desperate movements, rises, wants to flee: the countenance is wild, the mouth wide open, the gaze staring, the pupils widened. A violent cough occurs every now and then and is finally alleviated through an expectoration of a bloody froth of mucus. The breathing is by turns rapid, by turns completely absent, it gradually slows down, but a deep, coma-like sleep testifies to the great exhaustion of the organism.'<sup>55</sup>

In some cases, patients had to be sprinkled with water to gain consciousness; wine, port or champagne were given. Most did not want to repeat the ordeal – but it did happen that patients complained about receiving *too little* blood. Hasse reports of the 'blood thirst' expressed by some of his patients:

A patient who finally – and after a long period of wavering hither and thither with fear and excitement – has decided to submit to a lamb blood transfusion and who has [...] endured the often-painful preparation of the vein, such a patient wants something substantial as a reward. Only two, three or at most five tablespoons of blood! That is nothing. You cannot imagine what a

blood thirst the suffering patient shows when seeing the beautiful red lamb blood flowing by.<sup>56</sup>

A recurring argument against Hasse's method was the difficulty of ascertaining how much blood had been transfused. Was it only a few drops, or too many? To this critique, Hasse had an answer. After releasing the cannula from the patient's vein, he would let the lamb blood flow for another ten seconds into a measured beaker; he would then multiply the amount thus collected with the time of the transfusion. The critics doubted that this procedure could give an accurate estimate since the increased pressure in the patient's vein would prevent the donated blood from flowing into the patient at the same rate as outside the body and into the beaker.<sup>57</sup> Hasse therefore proceeded to weigh the lamb before and after transfusion, taking care to include any faeces released in the process.<sup>58</sup>

After the initial violent reactions had passed, the patients felt better for a while. Half an hour after the transfusion, they were seized with violent chills that continued for half an hour to a couple of hours. This was followed by profuse perspiration, a high temperature and a rapid pulse and, for some patients, a severe headache that lasted for hours. Thereafter, the patients seemed to feel quite well. They ate and slept, and their temperature became more or less normal. Some had red blood cells or albumen in their urine, others not. Some got itchy urticaria for a few days, others not.

One who experienced this quite painful itching was Dr Redtel, a German doctor who had asked Hasse for a transfusion against his phthisis. 'The itching was intolerable, and I passed very bad nights,' he reported in an English journal. He also experienced terrible pains in the loins that, when they subsided, 'assumed a pulsatile character, synchronous with each arterial beat, so that they alternately increased and decreased, and with each increase of the pain I experienced a sensation as if the blood streamed in with a rush from the femoral vein into the great veins of the abdomen.'<sup>59</sup>

## Getting better?

Some doctors describe an almost magical change in symptoms after the transfusion.

Merkel reported: 'Visiting him in the morning, I found him sitting up in bed, just awake from a sound sleep, exclaiming, "It is the best night I have

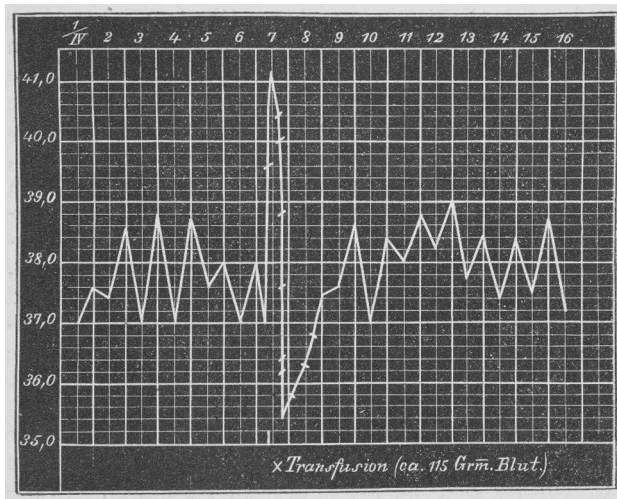


Figure 15. A temperature chart showing patient's increased temperature at the time of transfusion (Fiedler & Birch-Hirschfeld 1874, 556).

had for a year" and asking for something to eat'.<sup>60</sup> Masing, too, told of the sudden great appetite of a patient who had previously hardly eaten at all: at noon a bowl of meat soup, a beef cutlet and large glass of beer, later egg, milk, wine, coffee and tea.<sup>61</sup> Hasse claimed that most of his patients, after transfusion, became very talkative. They joked and made witty remarks; some were so excited that he only with some effort could calm them down.<sup>62</sup> Several patients soon left their beds and took walks outside. One 59-year-old woman, previously a very sick patient, even climbed 'a sizeable mountain' two days after the transfusion. She claimed having experienced no need to rest even once and no problems whatsoever with her breathing.<sup>63</sup>

In some cases, this happy condition lasted. Several physicians reported that their patients had gained weight and gone back to work or other activities. Hasse, for example, told of a 23-year-old tuberculous woman who, some weeks after the transfusion, 'already ha[d] flourished as a lively dancer at two recent harvest festivals'.<sup>64</sup> Von Cube's phthisis patient, transfused by Hasse, went from a very dismal state to almost full recovery. He had gained enough strength from the transfusion to journey to a warmer place when the weather

turned cold.<sup>65</sup> For Brügelmann, a combination of better diet, steam inhalation and lamb blood transfusion was beneficial for his patient. He still had an intact left lung; thus, Brügelmann concluded, transfusion seemed to be of value at an early stage of the disease.<sup>66</sup> And Dr Redtel, transfused by Hasse, and the only patient who has given an account of his ordeal, thought the operation useful, although it had not helped him much:

As regards phthisis it appears that the best results are obtained in those cases where the lung disease was the result of degraded nutrition—e.g., in phthisical women after frequent childbearing, where the greatest and most remarkable results were obtained. Less remarkable, and indeed even doubtful, has been the result in those patients where the disease of the lung was the primary lesion and general health was secondarily affected. This was my case. Yet Hasse assured me even here there have been good results, sometimes weeks or months after the operation.<sup>67</sup>

Other physicians were sceptical. It is well known, one remarked, that phthisis patients, even without a transfusion, suddenly may become strikingly better.<sup>68</sup> This argument was taken up by Herman Alexander Stern, a young doctor who on Christmas Eve 1874 defended a thesis on transfusion. He had earlier that year assisted Hasse with transfusions to three very sick phthisis patients. They initially felt quite well, and Stern asked how this could be explained.

His answer may seem cynical: 'Phthisis sufferers are in some respects the most obedient and grateful of patients.' Any random medicine with a new and different colour was welcomed by them. It gave them hope of a wonder cure with a healing effect greater than all their previous medications. 'And indeed, what a miracle! Maybe an hour after the first spoonful is taken of this new medicine, the patient feels much better and stronger than before'. It should, therefore, he added, come as no surprise that phthisis sufferers, almost without exception, felt so much better after a lamb blood transfusion. They sensed the new, healthy blood seeping through their veins to the ailing lungs, were convinced that blood from such a pious little lamb *must* act as a strong restorative drug:

The very experience of a transfusion will make such a tremendously imposing impression on the patient that the subjectively felt improvement can partly explain why, after the transfusion, the cough is no longer as agonizing as it used to be, that it does not return so often, that bodily strength has



improved substantially and all this may be a real conviction on the patient's part but it is, I believe, above all created by an unconscious self-delusion.<sup>69</sup>

The argument about the naïve credulity of phthisis patients was a recurring one. There is a tendency among them, the Swedish physician Svensson noted, to improve, no matter what he gave them, as long as it was an interesting novelty. A combination of iron, quinine and arsenic would, for example, have the most wonderful effects, 'and friends of transfusion have not failed to use such restorative means in combination with, or soon after, the transfusion'.<sup>70</sup> Fiedler and Birch-Hirschfeld, too, deplored the delusion among phthisis patients that 'fresh and healthy blood was flowing in their veins'. This was a misconception encouraged by the glowing press reports of this allegedly successful remedy for tuberculosis.<sup>71</sup>

Still, Stern (and others) had to explain the patients' objective improvement, especially the decrease in temperature and the greater appetite. It could perhaps be, Stern assumed, that any increase in fluid in the vessels would lower the amount of fever-inducing substances in the blood. In any case, he added, this effect had been only temporary in the three cases that he observed. During the first few days after the transfusion the patients felt quite well, but within a few weeks all three had died.

A similar fate befell several other transfused phthisis patients. 'Healing was [...] in no case so constant, as some writers have reported and as others who have treated transfusion more theoretically than practically have hoped for and promised', Heyfelder concluded.<sup>72</sup> Also Thurn, initially quite positive, later changed his mind: the transfusion had not fulfilled what his patients had expected from it. They first improved somewhat, but then a rapid deterioration set in.<sup>73</sup>

## Still worth trying?

Thus, the experiments to investigate Hasse's claim to have found a cure for phthisis had, in many cases, given a negative long-term result. Still, some patients *did* improve. The Dresden physicians Fiedler and Birch-Hirschfeld were baffled by these results. They had reluctantly made six transfusions just to check whether the therapy was worth trying on lung patients. No improvement occurred, rather the opposite. So they asked: How can we explain the difference between Hasse's successes and our failures?

Fiedler and Birch-Hirschfeld then proceeded to a systematic comparison of cases. The difference between them and Hasse seemed to be due not to how they operated, nor to the amount of blood transfused. The direct effects on the sick person were also the same in almost all respects. Perhaps they had treated patients at different stages of the disease? A careful comparison of disease histories showed no particular benefits to only early stage patients. The difference remained 'unexplained', they concluded, and left it for the future to decide whether Hasse's results would hold. They themselves, however, did not want to make any further experiments since they found it 'inexcusable to henceforth use a procedure for the unhappy phthisikers that is so troublesome and painful for them, a procedure that we from our results cannot give the slightest therapeutic worth'.<sup>74</sup>

Hasse, not surprisingly, did not agree. After his first fifteen cases, he made some fifty more lamb blood transfusions on patients with phthisis and other diseases. The critical debate, the negative results by others and the attacks on his ideas (more of this in chapter 6) caused him to change his arguments for why a lamb blood transfusion might be helpful in some cases of consumption. It would not cure phthisis, he now argued, but it could improve the patient's nutritional status. It could help those phthisis patients who had lost appetite, ceased to eat properly and therefore had degenerated into an anaemic state. A transfusion would give them an appetite and enough strength to respond to other treatments, and recover. Therefore, he now thought that transfusions should be given only to patients in the early, curable, stages of phthisis.

Still, he wondered, what to do with the terminally ill patient, the one who begs the doctor for help and 'clings to what he considers a life-saving transfusion like a drowning man to the last blade of straw!'

Should we then say to him, 'A transfusion can no longer help you'? You would then have made his last hours of life empty and embittered, when a transfusion could have given him an invigorating ray of hope. For these psychological reasons, you cannot restrict transfusion to only those [in the early stages of the disease].<sup>75</sup>

Should the lamb blood experiments continue, then? This was a not uncommon opinion, even among the sceptics.<sup>76</sup> Perhaps the physiologists were right in their verdict that 'species-alien' blood could not cure consumption, the Swedish doctor Curt Wallis noted in his review of the issue in 1876. Still, he concluded, the issue was 'far from closed' and, above all, it was all too urgent and important to be ignored:

It is here not a question of a new, albeit uncertain, therapy against the common cold or blisters, but humanity's most formidable enemy among diseases. And then, it seems to me that we have no right to leave the question undecided upon because of insufficient investigations but should keep on trying diligently until the issue has been resolved.<sup>77</sup>

