

When the Heart Stops

Prof. V. V. Kovanov

Head of Organ Transplantation Laboratory, U.S.S.R. Academy of Medical Sciences

TODAY heart transplantation operations are no longer considered an impossibility. However, no mature scientist, including Christian Barnard, considers the problem of transplantations of the heart and other organs fully solved. In addition to the generally known problems such as tissue incompatibility, there are a number of other difficulties in clinical practice such as exact defining of the indications for an operation, the choice of a donor, monitoring of the myocardium prior to transplantation, etc. Next to overcoming the tissue barrier, the attention of doctors and scientists is focussed on the problem of restoring the neural connections in the transplantation organ. As we all know, all the reactions in any living organism are controlled by the nervous system. And very complex metabolic and structural changes occur in tissues that have been transplanted to a new side. Complete atrophy of an organ is usually preceded by serious violation of protein, carbohydrate, electrolytic and hormonal exchange. To avoid this we must learn to restore the neural ties of the transplant more or less quickly. In principle it is, of course, possible.

Even more important it is to make completely clear the difference between life and death. Because of the lack of exact criteria there is always a tense and nervous situation in the operating theatre. The doctor's conscience appeals; do not haste, there is still a spark of life in the patient's body. Try and fan it. But the surgeon's reason demands that the final moment should not be allowed to pass, after which the heart will no longer be able to function. After all yet another life depends on this.

Science is persistently trying to moderate the dramatism of the events taking place in operation theatres, but has not yet pronounced its final word. The need for it is

borne out by the hundreds of cases, when after clinical death (complete cessation of breathing and heart-beat) people were stably returned to life. There was the case of the world-famous Soviet physicist who was reanimated three times. Only recently our physicians obstinately 57 times "started up" the heart of a prominent Soviet surgeon, who is still with us and alive.

Many doubts and difficulties would probably disappear, if physicians had at their disposal spare organs or could use those of animals. The ideal transplant is a living, beating heart obtained immediately after death (minutes are not taken into consideration). To be perfectly frank, we have not yet learned to reanimate dead hearts. But maintaining a minimum spark of life in them is a totally different matter. This means that we have to search and venture, so that the concern over a suitable transplant would no longer be the Achilles' heel of transplantation operations.

Attempts have been made to use the organs of animals for transplantation. In particular, we know about the experiment of the American Surgeon James Hardy. This is an interesting case and merits our scrutinizing it more closely. On January 27, 1964 a 68-year-old patient was brought unconscious and in a grave condition to the university clinic of the Mississippi Medical Centre. By evening the arterial blood pressure fell sharply and cardiac fibrillation set in. The patient was administered controlled respiration and a whole set of reanimatory measures was applied, but all to no avail. It must be mentioned that in the same clinic there was another patient, a young man, who was dying of brain tumour. The team of specialists had long ago prepared themselves for a heart transplantation, gradually perfecting the technique. The members of the

team had already been chosen. In short, both technically and psychologically the physicians were quite ready to perform the operation. However, fate decided differently. On January 29 the condition of the 68-year old patient became critical, complete heart failure was fast approaching. But the selected donor was still alive. Since there was absolutely no hope of saving him, the relatives said, take this heart to save another person. But the doctors could not make up their minds to take the beating heart of a patient, even though he was doomed.

But what about the dying man? No sooner was he put on the operating table, than his heart stopped. And here, faced by the tragic event, the physicians decided to undertake a bold experiment. They cut out the completely worthless human heart and sewed in its place the heart of a chimpanzee which had been prepared ahead of time, just in case. After it was warmed up and defibrillized, it began to beat rhythmically at a rate of 90 beats a minute. But immediately it became obvious that due to its small size it could not provide the necessary circulation for a large human body. Both the ventricles and the auricles kept overflowing, and the head surgeon James Hardy had to manually squeeze out the blood that had accumulated in the cavities. This continued for 60 minutes.

The heart. It is written about in newspapers, discussed at conferences, and thought about at night. It inspires poets and is the concern of state laws. As a physician, I know the heart does not beat simply to pump blood through the vessels, but also to bleed with grief, overflow with rapture and palpitate with inspiration. And when the heart of a human being, who it seems should live on and on, fails, then all "profound" considerations are brushed aside, and people give their blessing for the surgeon to risk, to dare, for he is attempting to turn aside the bony hand of death which has already raised its scythe over the patient's head.

—(Courtesy Indian Medical Forum)