He was carried on a stretcher to the police station, where he recovered consciousness sufficiently to give his name and address, and to say that he had been in a fight. He lost consciousness again in the ambulance conveying him to hospital, where he died, soon after admission and before any treatment could be contemplated, at 1.50 a.m.—that is, one and a half hours after receiving the fatal stab wound of the heart.

Discussion

In this case neither pleural cavity had been opened, and the external haemorrhage, though considerable, was not free. Death was due to cardiac tamponade. It is generally accepted that a rapid accumulation of about 400 ml. of blood within the pericardium is incompatible with life for more than a very short time. With free leakage of blood from any of the heart chambers, such a volume will accumulate rapidly. For this reason, any penetrating wound of the heart which gapes, or any penetrating wound of the thin-walled atria or of the intrapericardial portions of the large vessels, is likely to cause rapid death, either from tamponade action if the blood cannot escape from the pericardium, or from free haemorrhage if it can—for example, into one or other pleural cavity. Even so, the possibility of some activity exists, and Kerr (1954) quotes the case of a man who, after receiving a wound $\frac{1}{2}$ in. (1.3 cm.) long in the intrapericardial part of the superior vena cava, negotiated a fence and walked 30 yards (27 metres) beyond it before collapsing.

In the present instance, survival and movement were much more extended, and it must be inferred that the accumulation of blood in the pericardium was comparatively gradual. For this the explanation no doubt lies in the fact that the wound, though $\frac{1}{2}$ in. (1.3 cm.) in length, penetrated the thickness of the right ventricular wall in an oblique manner, so that a partial valve-like closure during systole might reasonably be postulated. Furthermore, the internal opening of the wound into the ventricular cavity was sheltered underneath the anterior cusp of the atrio-ventricular valve, and, although the cusp was also penetrated, this would still tend to minimize leakage even during diastole.

With these factors operating to slow the rate of haemorrhage, it is interesting to speculate on the victim's prospects if the stab had also established free communication between the pericardial sac and the pleural cavity. It is

doubtful whether his range of activity would have been greatly increased, but it is possible that his period of survival might have been prolonged, perhaps even to the extent of permitting successful surgical intervention.

In conclusion, it may be added that there is little doubt that the victim, from the moment he received his heart injury, was seriously shocked and weakened. The case therefore provides no evidence that a person so wounded might still be capable of strenuous exertion—for example, a sustained physical struggle—and we know of no case record which suggests such a possibility; but a person so incapacitated might still be able to discharge a firearm or use some other weapon.

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NURSING HOISTS

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The value of a lifting-aid for nursing purposes is most appreciated in the home where a severely disabled patient is being looked after by one person; but with the present-day shortage of nurses, lifting-aids may be of value also in institutions for the aged or chronic sick. There are certain manœuvres which involve an undue strain on the nurses or relatives even when the patient is not very heavy. These include lifting the patient between bed and chair or commode, in and out of a bath, and lifting up a patient who has slid from his chair to the floor. For home nursing a mobile and transportable form of lift is most useful.

FIG. 1.—Nursing hoist No. 4 (Fig. 1a). The hydraulic jack is being operated by the nurse's right hand. The patient illustrated has a spastic paralysis of both legs and the right arm. In Fig. 1b he is being lifted with two slings from the floor (or it could be a bath), and in Fig. 1c he is being swung on to a wheel-chair.

With a view to providing for these needs, we have during the past two years been developing various types of lift, and three of these seem to be successful enough to be of general interest. Two of these (Nos. 4 and 6) lift the patient bodily by a hydraulic jack system, while the third (No. 5) involves counterbalancing the patient with six 25-lb. (11.3-kg.) weights to make him 150 lb. (68 kg.) lighter.

All these three devices use wide canvas slings to support the patient, and in practice one set of slings

FIG. 2a

FIG. 2.—Nursing hoist No. 5. A patient with a left hemiplegia is being suspended on three slings by six counterbalancing weights. In Fig. 2a he has been raised from a bed, and in Fig. 2b the hoist has been rotated to place him in a chair. The patient assists the manoeuvre with his right hand. The patient can also be lowered to floor level, as would be required for, say, a bath.

FIG. 2b

is allotted to each patient, so that they can to a large extent be left in position continually. Two wide slings as illustrated are sufficient for many patients, but when there is flaccid paralysis of the trunk or neck extra slings will be required. Nylon slings are convenient to use in a bath or for lifting incontinent patients. The staff at Headington Hill Hall Rehabilitation Centre, Oxford, have contributed greatly to this study, especially Mrs. Irene Parsons, the commandant, and Mr. Alsford, who is instructor in the workshops.

Headington Nursing Hoist No. 4.—This appliance is a mobile lift. It is of sturdy construction and is a modification of the "Sherpa" industrial hydraulic truck. In the original form this is a fork lift, but with the modifications illustrated in Fig. 1 the patient is lifted by slings and conveyed easily to or from bed, chair, bath, floor, or motor-car as required. The lifting part of the carriage can be raised a distance of 3 ft. (90 cm.) by a hydraulic cylinder. A relief valve provides for fully controlled lowering. About 2½ cwt. (127 kg) can be lifted. The carrier bar to which the patient is attached is suspended by a swivel and a hinge to give a wide range of manoeuvrability, and adjustment of the patient's centre of gravity is the best way. The height of the carrier bar can also be quickly adjusted to the height suited to the task. This hoist is also suitable for raising the end of a heavy bed for the insertion of supports.

Headington Nursing Hoist No. 5.—This is a form of crane and is not mobile. It is shaped like an inverted L (Fig. 2). The vertical limb is about 6 ft. 6 in. (2 m.) long, of which the upper one is fixed by a bracket to the wall above the head of the patient's bed (or in a bathroom) and the lower one to the floor vertically below. Both vertical and horizontal limbs are of box-like construction, and the former is subdivided into six channels in which counterpoise weights can move. The horizontal limb is about 3 ft. (90 cm.) long and carries six pairs of pulleys

sited in the correct relation to the channels in the vertical limb. A cord attached to the upper end of each counterpoise weight passes vertically upwards to the first pulley of a pair, then horizontally to the second pulley, and then downwards to end in a wooden handle carrying a steel hook below. In use, slings are employed as with Hoist No. 4. Each handle is pulled down in turn and its hook engaged with an eyelet on the slings. The counterpoise weights each

weigh 25 lb. (11.3 kg.), so that when all are in operation very little additional power is required from the nurse in order to lift the average patient and swing him from his bed or bath to his chair, or vice versa. The counterbalancing support can be applied as desired for a variety of nursing manoeuvres.

Headington Nursing Hoist No. 6.—This small hoist (Fig. 3) is suitable for home nursing and is supported on hinge pins firmly secured to a solid wall.

The lifting arm is raised by operating the handle of the hydraulic jack, and the length of the lifting wire is easily adjusted to the requirements of the task. The hoist can be lifted easily from one set of hinge pins to another fixed elsewhere, say

FIG. 3.—Nursing hoist No. 6. The small hydraulic jack pushes up the lifting arm directly, while the hinged wall support allows the patient to be swung to a chair beside the bed. This is also suitable for lifting from a bath.

in the bathroom. This type of hoist, with a shorter lifting arm, could be mounted on a light mobile carriage, which could be dismantled to travel with the patient in a motor-car.

Headington Hoist No. 4 is manufactured by the Salisbury Precision Engineering Co., Ltd., 1, Buckingham Palace Mansions, Buckingham Palace Road, London, S.W.1, under the name Headington Sherpa nursing hoist. Hoists Nos. 5 and 6 are being assembled in the workshops for disabled at Headington Hill Hall Rehabilitation Centre, Oxford. Inquiries should be addressed to the commandant.