THE LUCITE CALVARIUM

A CASE REPORT*

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The purpose of this report is to describe a situation which was benefited by the use of a lucite calvarium. This is probably the first use of the acrylic cap in a human where there was avulsion of the scalp, skull, dura and brain; it was applied in an effort to get the patient into such condition that he could be evacuated to a "rear" area from the "forward" area at Wonsan, Korea.

The original work with the lucite calvarium, in a manner similar to that to be described, was done on monkeys by Shelden, Pudenz, Restarski and Craig at the Naval Medical Research Institute at Bethesda, Maryland in 1943 and 1944. Acrylic substitutions for ordinary skull defects have been in use since 1940, and have recently been appraised in Reeves' monograph on cranioplasty.

CASE REPORT

On Oct. 31, 1950 a right-handed hospital corpsman was involved in an accident when he was helping at the loading of a stretcher-patient onto a helicopter. He had evidently backed up toward the rear of the plane and was struck in the head by the whirling propeller, which rotates vertically. Three of the four blades of this propeller were broken off as they cut into his head.

The patient was rendered unconscious immediately and a battle dressing was applied to the macerated right side of his head. He was given last rites by the Catholic Chaplain and was transported to the hospital ship U.S.S. Consolation (AH-15) where he was admitted to the neurosurgical service in critical condition. He arrived aboard 60 minutes after the accident. Therapy for shock was instituted and plasma, blood, and intravenous fluids were given; his B.P. rose from 76/50 to 100/70.

Operation. Preparations were then made for craniotomy; however, because he was rapidly losing considerable amounts of blood and going into shock again, it was necessary to remove the head dressing and put hemostats on the bleeding pulsating arteries. Thus the exposed right middle meningeal and ascending parietal and parietotemporal branches of the middle cerebral artery were clamped (Fig. 1). Then the wound was packed with gauze; his head was shaved; and surgical "prep" was accomplished.

A large amount of foreign material including sand, flecks of paint from the plane's propeller, free chunks of scalp, pieces of skull bone, and blood-matted hair were removed from the cranial vault. Debridement was continued, using a sucker, and necrotic and macerated brain tissue was removed from the whole area of the parietal lobe, the posterior aspect of the frontal lobe, the superior half of the temporal lobe and the anterior part of the occipital lobe on the right. The white matter was involved to a depth of 5-6 cm. in certain areas and the temporal horn of the right lateral ventricle communicated with the wound. Hemostasis was

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* The opinions or conclusions in this report are those of the author. They are not to be construed as necessarily reflecting the views or the endorsement of the Navy Department.

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difficult, especially with the stump of the middle meningeal artery and with the large branches of the middle cerebral artery. The edges of the skull defect were rongeured back until healthy dura was exposed all around the brain defect. Dr. J. Witt removed a large piece of fascia lata from the patient’s right thigh and it was sutured in place across the dural defect, which was the size of the palm of the operator’s hand. As many of the attached scalp fragments as could be salvaged were put into their anatomical position and sutured with a plastic technique. Large areas of scalp and skull substance were missing, and because the wound was not considered clean no primary scalp substitution was attempted. Ten cc. of saline containing 10,000 units of penicillin were injected under the fascial transplant; the wound was dressed; and the patient was returned to the ward in fair condition.

Course. He regained consciousness in about 1 ½ hours after operation and was extremely irritable and noisy in spite of intramuscular paraldehyde and sodium phenobarbital. Chemotherapy for infection consisted of intrathecal penicillin, intravenous sodium sulfadiazine, and intramuscular penicillin and streptomycin.

On the 5th postoperative day the patient began to talk coherently but a CSF leak at the margin of the dural transplant became definite, and it was necessary to resuture the fascia lata flap.

On the 8th postoperative day a second CSF leak developed as another corner of the dural transplant broke down, necessitating a second repair. The fascial transplant appeared to be steadily shrinking and drying out and it ultimately separated from the dural edge a third time.

On the 11th postoperative day a vinylite sheet was sutured across the scalp wound to enclose a fluid media of saline containing penicillin over the exterior surface of the fascial flap. However, this provoked a markedly accelerated outpouring of leucocytes from the dura and scalp and it had to be removed in 48 hours.

On the 14th postoperative day Capt. F. E. Jeffreys, Dental Corps, U.S.N. fitted a mold jacket around the skull defect and an exact alginate hydrocolloid impression was made. From this mold a methyl ethyl methacrylate clear plastic calvarium was fashioned to fit exactly.