

hours duration at a temperature of 31° C., with adequate red cell replacement, showed a further decrease in the rate of erythropoiesis in the immediate postoperative period as measured by a Fe-59 half-life of 134 minutes. To establish whether the underlying cause for the decrease in rate of erythropoiesis was due to hypothermia or anesthetic agents, a small group of nonhypothermic patients was studied in the immediate postoperative period. The latter group showed no decrease in erythropoiesis—confirming that the reduction observed in the hypothermic patient is due to the subthermic state. *Summary:* The comparison of Cr-51 and Fe-59 isotope tracer studies preoperatively and postoperatively, substantiated the fact that Fe-59 half-life was satisfactory for measurement of erythropoiesis, and in this series, the increased rate of red cell production was synonymous with a reduction in the total body hemoglobin. [The Ferrutope was supplied by E. R. Squibb & Sons. The project was supported by an Atomic Energy Commission Grant, AT(30-1) 2486, and The American Red Cross.]

Effects of Experimental Subarachnoid Perfusion Cooling and Rewarming on the Spinal Cord. MAURICE S. ALBIN, M.D., ROBERT J. WHITE, M.D., DAVID E. DONALD, PH.D., COLLIN S. MACCARTY, M.D., and ALBERT FAULCONER, JR., M.D., *Mayo Clinic and Mayo Foundation, Rochester, Minnesota.* It was thought that an isolated selective technique to reduce spinal-cord temperature would provide information on the effect of cold on nervous tissue in an intact biologic preparation, provide a useful method for physiologic studies, and have clinical application in the treatment of spinal-cord trauma. *Method:* By a preferential cooling technique, 13 dogs were perfused via a plastic catheter inserted beneath and sealed in the dura following laminectomy at each site. Cold isotonic sodium chloride at 5.0° C. was used to perfuse 8 dogs from T-4 to L-5 levels, and two dogs from C-3 to L-5 levels. Three dogs served as controls: two were perfused with isotonic sodium chloride at normal cord temperatures from T-4 to L-5 levels, and one from C-3 to L-5 levels. Perfusion was achieved by gravity; flow rate was 10.0 ml./minute. Temperatures

were recorded with needle thermometers at inflow and outflow catheters and within the cord during perfusion. Rectal temperature, mean arterial pressure, and heart rate were monitored. In 7 animals, brain temperatures were taken with needle thermometers inserted through bilateral burr holes. *Results:* In the 8 dogs perfused from T-4 to L-5 levels, cord temperature was reduced to a mean of 14.4° C. at L-5 level and to a mean of 10.6° C. at T-4 level after an average of 68.3 minutes of perfusion. In the two dogs perfused from C-3 to L-5 levels, cord temperature reached a mean of 13.0° C. at L-5 level and a mean of 9.6° C. at C-3 level after an average of 40 minutes of perfusion. Cords of 4 animals previously cooled were allowed to rewarm spontaneously by immediately stopping perfusion. These cords reach preperfusion temperatures in an average of 13.2 minutes. On recooling, they reached lower temperatures sooner, averaging only 33 minutes of perfusion. In the three controls, cord temperature was unchanged after 2 hours of perfusion. Brain temperature in four cold-perfused animals declined 2.5°, 2.5°, 3.5° and 4.0° C. respectively from levels observed before perfusion, but remained unchanged in controls. Rectal temperatures did not fluctuate significantly during perfusion in any animals. Three dogs perfused from T-4 to L-5 levels and two perfused from C-3 to L-5 levels showed significant fluctuations in both heart rate and mean arterial pressure during cooling. To test the effects of profound cooling of the cord on long-term survival, two animals were perfused from T-4 to L-5 level for one hour; cord temperatures of 17.5° C. and 11.0° C. at L-5 and 10.5° C. and 8.5° C. at T-4 level were reached. The animals recovered completely with no subsequent neurologic damage.

Effects of Morphine and Curare on the Respiratory Response Curve. J. WELDON BELLVILLE, M.D., and ELLIS N. COHEN, M.D., *Department of Anesthesia, Stanford University Medical School, Palo Alto, California.* The respiratory depressant effects of morphine and curare and the combination of morphine and curare were evaluated in 8 healthy male subjects. Respiratory depression

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