MEDICINE

Blood Shunt Technique

➤ A NEW "SHUNT" technique that could offer advantages over the conventional heart-lung machine in some heart surgery was reported at the scientific meetings of the American Heart Association.

Tried only on animals so far, the shunt technique appears to prevent the development of dangerous abnormal rhythms or fibrillation in the ventricles of the heart. It bypasses only one ventricle instead of the entire heart, as the heart-lung machine must do.

Coronary artery obstruction is the cause of most heart attacks, but fibrillation is one of several problems that have kept coronary artery surgery on a predominantly experimental basis so far.

Drs. Prescott C. Rasmussen and William E. Bloomer of Harbor General Hospital said at the Los Angeles meeting that the new support system entailed placing a temporary shunt between the left atrium, the upper heart chamber, and the nearly subclavian artery of the general circulation. Oxygenated blood returning from the lungs is thus made to flow directly from the upper chamber to the body, rather than through the left ventricle as usual.

Dr. Frank C. Spencer of the University of Kentucky, Lexington, reported experimental work done there with the help of a team of scientists in an effort to overcome another crucial problem impeding coronary artery surgery.

The scientists used ultra-fine sutures to solve the difficult problem of operating on arteries only one-eighth of an inch in diameter that are in constant motion as the heart beats. Dr. Spencer said that in a two-year series of 78 animal experiments they placed the sutures in these small vessels, using a heart-lung machine to chill and quiet the beating heart until the surgery was over.

To reconstruct the coronary vessels the scientists tested a variety of procedures, including patch grafting, removal of obstructions, replacement of diseased segments with sections from more expendable nearby blood vessels, or joining another artery to the coronary vessel beyond the site of obstruction.

Only two animals showed clotting following the operations, and in follow-up studies of 32 animals to see whether or not the operated coronaries would remain open for long periods, the Kentucky team found only three instances of re-closure.

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SPACE

Meteoroids and Spacemen

➤ THE CHANCES that an astronaut will be struck by a large meteoroid in space are about the same as his chances of being struck by lightning on the ground.

Such is the estimate of Dr. Fred Whipple, director of the Smithsonian Astrophysical Observatory, Cambridge, Mass., and other scientists studying the results of data supplied by the satellite, Explorer 16.

They also suspect now that the impact of natural debris of all sizes on spacecraft is neither as frequent nor as violent as had been feared.

The findings, if confirmed by future scientific satellites, would mean that spacecraft can be equipped with thinner armor at great savings in precious weight.

The barrel-shaped Explorer 16 was launched last Dec. 16. It stopped sending signals on July 25, because of a malfunction which, engineers said, was not due to a meteoroid collision.

During its active career the satellite was bombarded with about 150,000 meteorites, most of which were smaller than dust specks. It had been thought that these specks, traveling at between seven and 45 miles a second, would hit satellites like bullets.

But the deepest penetration recorded by Explorer 16 was only three one-thousandths of an inch into stainless steel.

Dr. Whipple said this is further support for his belief that most space debris is "fluffy stuff." He thinks a "meteor bumper," a thin metallic skin outside a satellite, would reduce the hazard "so there would not be much to worry about."

He said the fluffy material probably came about when the sun was being formed and silicates and metals far from the sun cooled into crystals like snow flakes. Large collections of these form comets.

Several other projects for studying meteorites are underway. Late next year improved versions of Explorer 16 will be launched.

Meanwhile, the Fairchild Stratos Corp., Hagerstown, Md., is developing a two-ton meteoroid satellite to be launched by a Saturn I rocket. When in orbit, the satellite will flap out two large wings exposing 2,000 square feet to meteorites. Explorer 16 has only 28 square feet exposed.

Six stations around the world soon will monitor radio signals bounced off meteors, and a rocket will release a meteor-detecting paraglider through space.

Scientists plan to release more artificial meteorites in space and study their reactions. The X-15 research plane has a device for collecting high-altitude dust samples in hopes of picking up stray pieces of extra-terrestrial matter.

The National Aeronautics and Space Administration's Office of Space Sciences also has a program for launching sounding rockets during meteoroid showers in an attempt to catch chips of lunar material knocked into space by meteoroids hitting the moon.

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SPACE

Cosmic Rays From Stormy Sun Seen Hazard in Space

➤ COSMIC RAYS poured out by a stormy sun would be a hazard to manned space travel to the moon or in an orbiting station.

Radiation reaching earth during times of great solar upheavals gives clues to its intensity in space. Within the three years when the sun was at its peak in activity in 1958, there were six of these mighty storms, called solar flares, that would have exposed a space traveler to serious radiation.

The radiation from two of these flares was intense enough to make necessary extra precautions to protect space travelers, Drs. Phyllis Freier and William R. Webber of the University of Minnesota reported. All six of the flares produced enough radiation to cut down a man's efficiency. A man in space for a week or ten days following a large flare could receive a killing dose.

For short missions of a few days or weeks, "solar weather" could possibly be predicted, thus greatly decreasing the chances of a heavy radiation dose following a large solar flare.

The scientists calculated the radiation dosage on the basis of spacecraft shielding of four pounds per square foot. Increasing this to ten pounds per square foot would reduce the radiation dose considerably, they reported in Science, 142:1587, 1963.

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