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IIT-M, Sankara Nethralaya develop mobile cataract surgery units

- Staff Reporter

The mobile units will travel to the remote areas and perform cataract surgery.

Cataract is one of the leading causes of blindness in India accounting for around half of the reversible blindness. The number of cataract blind which was 7.75 million in 2001 will increase to 8.25 million in 2020 in India.

The global distribution of this problem is grossly uneven, with 90 per cent of cataract-blindness being in developing countries. In developed countries, cataract accounts for only five per cent of blindness.

Treatment

Cataract can be treated only through surgery and artificial lens implantation. The surgical procedure and technology has evolved over the past decades and has reached a great level of maturity, reliability and safety. However, accessibility remains a huge barrier towards treating cataracts.

Today only 25 per cent of the Indian population has access to surgical care, which is practised mainly in urban areas.

Moreover, infrastructure facilities including roads, electricity, clean water, toilets are very limited in rural areas, thus hampering access to developing permanent healthcare facilities.

Challenges

Given these challenges, there is a longstanding need for technology that will solve the problem of accessibility and still provide the highest quality of surgical care under the constraints of rural setting.

IIT-Madras, a premiere technology institution, and Sankara Nethralaya, a leading ophthalmology institution, with special approval from the Ministry of Health, have jointly developed 'Mobile Cataract Surgery Units' that will travel to the remote areas and perform cataract surgery.

The surgical unit itself consists of two vehicles — one preparation vehicle consisting of patient preparation set-up, changing room, and chemical toilet, and the surgery vehicle consisting of the operating chamber and sterilization chamber.

Having two vehicles instead of one large vehicle will enable the surgery unit to access rural areas with narrow roads. These two vehicles travel independently and are connected at the camp site through a retractable vestibule for movement of people and equipment during the surgery camps. There are two additional vehicles for eye examination and spectacle dispensing and a utility vehicle to transport goods.

State-of-the-art

The surgery vehicle is lined with (316 SS) steel walls all around to ensure a germ-free surface. It is fitted with a specially-designed air-handling unit (AHU) to provide pure air to the operation chamber. This is achieved by a 3-stage air-filtration process, using 10 microns, 5 microns, and 0.3 microns (HEPA) filter.

Since available water in the rural areas is not suitable for hospital requirements such as scrubbing and sterilization, a reverse osmosis (RO) plant is installed underneath each vehicle floor. It filters and purifies available raw water and supplies water of purest quality to the surgery vehicle.

A 20 kVA generator supplies uninterrupted electrical power for the units. Constraints of confined space in the vehicle are handled through meticulous engineering design to accommodate all medical equipment in minimal space. Anticipating the problem of uneven surfaces in rural setting, each vehicle is provided with hydraulic jacks. These will keep the vehicles level and allow safe surgery to be performed.