Single-Port Robotic Arm a Gamechanger for Throat Cancer Patients

The da Vinci Single-Port robot is an example of how seemingly small advances in technology can drastically change cancer patients’ lives.

Sylvester Comprehensive Cancer Center, part of UHealth – the University of Miami Health System, is one of the only South Florida health systems to offer the da Vinci Single-Port robot, which surgeons at the cancer center use to remove tumors in the throat.

"Being on the cutting edge of robotic surgical advancements that can be applied across multiple specialties allows us to provide the best possible outcomes to our patients," said Dipen J. Parekh, M.D., founding director and chair of the Desai Sethi Urology Institute and director of robotic surgery.

Among the patients who benefit most from the new technology are those with squamous cell carcinomas of the tonsil and base of tongue caused by past infection with the human papilloma virus (HPV), according to Donald T. Weed, M.D., co-leader of the Head and Neck Site Disease Group at Sylvester and vice chair for academic affairs in the Department of Otolaryngology at the University of Miami Miller School of Medicine.
“Those are the most common throat cancers that we see in non-smokers,” Dr. Weed said.

Benefits of the Single-Arm Robot

The single-port robot is a gamechanger compared to previous robotic technology because it provides better access through the narrow opening of the throat, said Francisco J. Civantos, M.D., the Virginia M. Horner Endowed Chair in Head and Neck Oncology Research.

The older and more widely available robotic technology is designed for abdominal surgery and not ideal for ear, nose and throat (ENT) procedures, according to Dr. Civantos.

“In the older version, you have a telescope and two or three arms that actually do the surgery through separate little punctures. But throat surgery by nature goes through the mouth, so you’re coming in through a single hole with all the arms. To do the surgery, we had to use a mouth retractor that put pressure on the tongue and the throat and created swelling. Patients would go to the ICU for the night and spend five to seven days in the hospital,” said Dr. Civantos, who is also co-director of the Division of Head and Neck Surgery in the Department of Otolaryngology. “With the single port, we’re able to work through a much smaller opening. We don’t have to squeeze the tongue as much. We don’t create as much swelling, and patients go home sooner.”

Less Damage, Disruption from Surgery

Sylvester head and neck cancer surgeons use the single-arm robot most commonly in the back of the throat, and with single-arm technology the surgery has become much less destructive, according to Elizabeth A. Nicolli, M.D., a head
and neck cancer surgeon who also does reconstructive surgery at Sylvester.

“In the past we would have to open up the neck and do a lot of disruptive surgery to access this area and get the tumors out,” said Dr. Nicolli, who also is assistant professor of otolaryngology – head and neck surgery at the Miller School. “The single-arm devices result in less damage and stress on surrounding tissue. The single port is the first robot that is actually FDA approved for ENT surgery. Other disciplines, like urology, also use it, but our patients get the greatest benefit.”

The less invasive nature of the single-arm robot is one of several important benefits of the new robotic system. Another advantage is that more cancer patients are candidates for robotic throat surgery than with the traditional multi-arm system. For example, patients with tight throats, including sleep apnea patients, were not candidates for throat surgery with the multi-arm robotic device, but they are with the single-arm system. The newer robot also can access cancers that are farther down in the throat near the base of the tongue, epiglottis, and lingual tonsil area, according to Dr. Civantos.

**Removing Tumors 'En Bloc'**

Yet another big advantage for throat cancer patients is the single-arm technology makes it more likely that a surgeon will be able to retrieve the cancer in its entirety, rather than in separate pieces.

“Surgeons prefer to take tumors out ‘en bloc,’ which means in one piece, because we are concerned about losing track of
where the cancer is if we take the tumor out in pieces,” Dr. Civantos said.

Throat cancers, including HPV-related cancers, typically have a good chance of cure, even with standard therapies of surgery, radiation and chemotherapy. The problem for many patients has been living with the long-term effects of treatment, according to Dr. Weed.

“Use of the single-arm robot can improve patients’ long-term outlook,” he said. “With complete resection of the cancers, radiation doses can be reduced, or in select cases avoided entirely, and chemotherapy avoided as well.”

**HPV-Related Cancers on the Rise**

While the single-arm robot offers the same benefits to patients with non-HPV-related throat cancers, which generally occur in smokers, HPV-related cancers that are viral and not related to smoking have become more common.

“HPV-related cancers are the most common kind of oropharyngeal cancer that we see, and it has been steadily increasing for the last 15 years, overtaking smoking-related cancers of the throat and overtaking cervical cancer as the most common HPV-related cancer,” Dr. Civantos said. “At Sylvester, I would say I see five to 10 HPV-related cancers for every non-HPV-related cancer.”

And throat cancer patients are getting younger and younger, according to Dr. Weed.

“If we do surgery in a 40-year-old with HPV-related cancer, for example, and are curing the patient by removing the cancer, that patient will live another 50 years with the side
effects of whatever treatment we use. The single-arm technology allows us to continue to cure patients while ensuring that their quality of life is as good as it can be after treatment. That is a true gamechanger,” Dr. Weed said.