



Ideas and potential benefits of single-port robotic mastectomy and reconstruction

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Robotic approaches are gaining popularity in various fields of surgery. Their application to breasts was not widespread worldwide until now, compared to other surgeries since their introduction by Toesca in 2017 (1). Now, some European and Asian surgeons conduct robotic mastectomy and reconstruction and have reported acceptable outcomes in a few literatures.

As a breast reconstructive surgeon who has experienced over 200 cases of robotic mastectomy, I agree with the report of Farr *et al.* in most aspects but have somewhat different opinions on a few points (2). For the robot device, DaVinci Xi or Si was used in early robotic breast surgeries. It was feasible, but a little bit inappropriate considering the small breast pocket and the possibility of collision by multiple arms during mastectomy. After the introduction of DaVinci SP, due to its lesser space occupying nature, flexible three-dimensional camera, and need of just a short incision, it became the dominant robotic system in robotic breast surgeries in our institute.

Those authors described robotic breast surgery as being safely performed by experienced surgeons with limited previous robotic training, however, in our experience, the running curve may be different from surgeon to surgeon. We believe that the key factor in a successful outcome in robot mastectomy is the maintenance of blood perfusion to the mastectomy flap.

The common cause of limiting blood perfusion could be the failure to preserve the enough subcutaneous vessels due to a discrepancy between the straight scalpel direction and the sphere-shaped mastectomy skin flap after CO₂ inflation and burn injury after coagulation with high energy devices. If the mastectomy flap suffers from insufficient blood perfusion, skin or nipple necrosis can develop which is devastating in robotic mastectomy and vulnerable to infection, which can lead to total failure of prosthetic breast reconstruction.

To confirm sufficient blood perfusion, indocyanine green (ICG) video angiography can be useful. If the mastectomy flap shows suboptimal blood flow, we can consider staged reconstruction and insert a tissue expander as an initial stage. However, if the surgeon overcomes the running curve and angiography shows sufficient blood supply to the nipple and mastectomy flap, direct-to-implant (DTI) can be a viable option. In fact, robotic mastectomy has favorable conditions for abundant blood flow in virtue of the absence of an incision near the nipple.

In the early period, we experienced insufficient blood perfusion after robotic mastectomy, and experienced skin or nipple necrosis, burns, infections, and even an implant explantation (3). However, at present, prepectoral DTI using an acellular dermal matrix (ADM)-wrapped implant is the standard procedure, and other complications such

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as nipple necrosis or wound dehiscence seem to be less common compared to open mastectomy.

In addition to the caution of ‘too thin flap’, ‘too thick’, or ‘irregular thickness of flap’ could be another problem of robot mastectomy. ‘Too thick flap’ can be serious because it can increase the recurrence rate of the cancer, and ‘irregular thickness’ can also be a problem because it reflects the insufficient experience of the surgeon and can cause problems with both thin and thick flaps.

Nipple sensations can be understood in similar ways. If the mastectomy flap is secured with enough thickness, it is reasonable that the nipple sensation can be more preserved compared to an open mastectomy, which is usually accompanied by a periareolar incision.

The scar near the nipple areola complex can be a stigma for breast cancer patients. It can hurt the patient even after the completion of cancer therapy without recurrence. Robotic mastectomy and reconstruction by an experienced surgeon can avoid these scars in hidden areas and even show better sensation and less nipple necrosis (4). We believe this technique can open the next generation of breast oncologic surgeries and breast reconstruction surgeries.

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