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Case Report

Breast reconstruction in a patient with an implanted deep brain stimulator

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ABSTRACT

Deep brain stimulators (DBSs) are sometimes used to treat refractory movement disorders such as Parkinson's disease. When DBSs are implanted in a subcutaneous pocket in the chest region, breast reconstruction becomes a challenge because monopolar electrocautery can lead to DBS dysfunction or brain tissue damage caused by heat. We report a patient with a DBS who underwent one-stage implant-based breast reconstruction. We switched off the DBS before surgery and used monopolar electromagnetic cautery with minimum power settings to undermine the subcutaneous pocket for the breast implant. The DBS was switched back on immediately after completion of the surgery. The patient's postoperative recovery was uneventful with the DBS fully functional.

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Introduction

Deep brain stimulator (DBS) implantation is indicated for Parkinson's disease, dystonia, and drug-refractory essential tremors. DBSs have been implanted in more than one million patients worldwide since the 1980s.[1] The devices are typically implanted in the chest and then connected to an extension apparatus with leads, which are implanted in the brain.

There are limited numbers of reports about thoracic surgery in patients with an implanted DBS.[2,3] Meyring et al.[3] warned that monopolar cautery could not only lead to device malfunction but result in severe, irreparable brain damage. Hence, if monopolar cautery is necessary for the procedure, they advised that the energy level should be set at a minimum level and the dispersive plate placed so it does not interfere with the DBS and its wire.

Breast reconstruction involves using implant-based reconstruction or flap reconstruction. Tissue expansion is sometimes used to expand the breast's skin and muscle. For the patient described herein, who had an implanted DBS, we selected one-stage implant-based breast reconstruction to minimize the use of monopolar cautery.

Case presentation

A 63-year-old woman underwent total mastectomy for left breast cancer in 2013. A DPS (37,612 Activa™ RC; Medtronic, Minneapolis, MN, USA) had been implanted subcutaneously in her left upper chest in 2017 because of medically refractory Parkinson's disease. She later visited our department and expressed a wish to reconstruct her left breast (Figs. 1 and 2). We planned implant-based breast reconstruction with preparation for a tissue expander without using a magnetic infusion port.

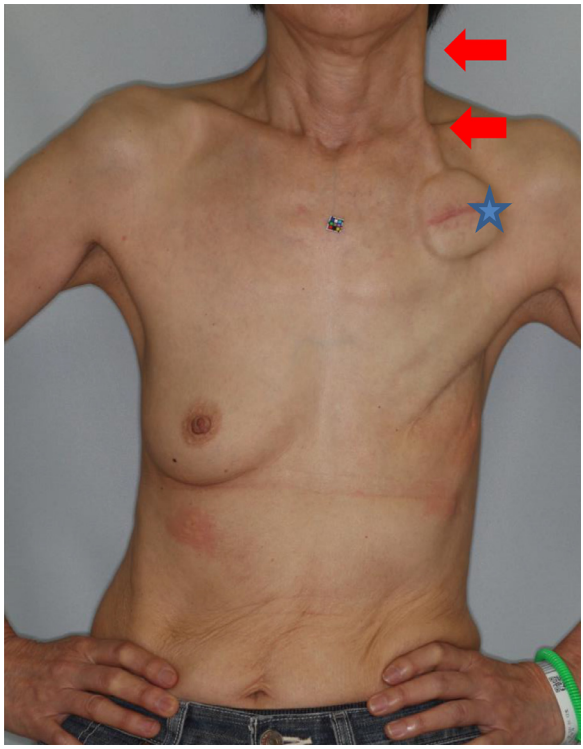

Fig. 1. Preoperative view. A deep brain stimulation (DBS) device had been implanted in a subcutaneous pocket in the chest region (star). Arrowhead indicates the extension to which it is attached.

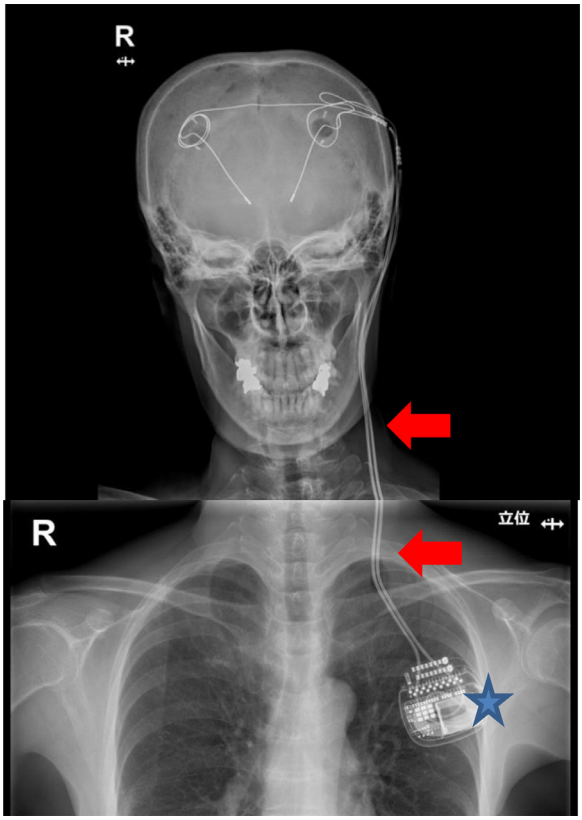

Fig. 2. Radiograph of the head and chest. The device had been implanted in the chest (star) and connected to an extension device (arrowhead) with leads, which are implanted in the brain.

The DBS was switched off just before induction of general anesthesia. After placing a dispersive plate on the right thigh, dissection was performed to prepare the tissues for a subcutaneous pocket in which to place a silicone breast implant. It was achieved using a monopolar cautery electromagnetic device with a minimum power setting.

Immediately after completion of the surgery, the DBS was switched back on, and the neurosurgeon confirmed that the device was fully functional. The patient's postoperative recovery was uneventful (Fig. 3). She did not require dose adjustments or additional medications for her Parkinson's disease.

Discussion

If a patient with a DBS suffers from breast cancer, special care must be taken. Son at al.[2)] described that bilateral pulse generators for DBS previously implanted in the anterior chest wall were repositioned to the anterior abdominal wall along with replacing the long extension cables to avoid their interference while conducting imaging studies, surgery, and radiotherapy related to the breast cancer.

Using a breast tissue expander with a magnetic infusion port exposes the patient to persistent electromagnetic forces and risks damage or malfunction of the device. We therefore select either two-stage reconstruction with a breast tissue expander without a magnetic infusion port followed by a silicone breast implant or one-stage reconstruction with a silicone breast implant. Additionally, if an implant's rupture is to be followed by magnetic resonance imaging, one may need to implant a DBS device such as the 37,612 Activa^{TM} RC.

Fig. 3. Postoperative view 8 months after the operation.

Conclusion

Implant-based breast reconstruction in a patient on DBS requires switching off the DBS before surgery and using monopolar electromagnetic cautery with a minimum power setting to avoid damaging the DBS or brain tissue caused by heat.

Role of funding source

None.

Ethical approval

Not required.

Declaration of Competing Interest

None.

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