

Reviewer Comments

**Reviewer A**

**Comment 1:** The only precision that I recommend to the authors is about breast reconstruction. The Poland syndrome, as You reported, is undoubtedly challenging in these patients also for the type of reconstruction to choose, as tailored to the patient as possible. For many years, new evolutions in breast reconstructive surgery have been introduced. The concepts regarding breast reconstruction reported in Your study are nowadays overcome by, for example, new types of breast implants. Therefore, I request the authors to review the concepts regarding breast reconstruction reported in the discussion (IE. Regarding the association between prepectoral/subpectoral reconstruction and capsular contracture.)

**Reply 1:** Poland syndrome also has a certain impact on breast reconstruction: The main methods of breast reconstruction are divided into autologous tissue breast reconstruction and implant breast reconstruction, the latter is still the most commonly used at home and abroad. Implant breast reconstruction can be divided into prepectoral breast reconstruction (PBR) and subpectoral breast reconstruction (SBR) according to the anatomical location of implant placement. SBR is the traditional method of inserting implants behind the pectoralis major muscle, including full muscle coverage with pectoralis major and serratus anterior muscle, and partial muscle coverage with acellular dermal matrix (ADM) or synthetic mesh. The coverage of the pectoral muscle can increase the safety of the operation and the concealment of the implant, but the adverse reactions caused by the dissection of the chest wall will also be brought. Because of the absence of the pectoralis major and minor muscles and chest wall malformations in patients with Poland syndrome, SBR often cannot be performed. In PBR, the implant is directly implanted into the native breast anatomical space between the flap and the pectoralis major muscle, which has the advantages of small trauma, light pain, avoiding movement deformity, natural breast ptosis, relatively easy operation, and short learning curve. However, there are also limitations, including the lack of sufficient soft tissue coverage, which may easily lead to poor aesthetics such as obvious contour and ripple sign of the implant, and complications of the flap or incision may easily lead to reconstruction failure. In recent years, with the common development and progress of mastectomy technology, mesh materials, implant technology, tissue perfusion monitoring, autologous fat transplantation, and other fields, the application of PBR has been promoted, and it has shown a rapid increase trend. PBR has similar surgical safety to SBR and has advantages over SBR in reducing postoperative pain, eliminating motor deformity, reducing cyst contracture, and improving patient satisfaction, which is also the reason why PBR is becoming increasingly popular. On the premise of ensuring the safe resection of the tumor, obtaining a flap with a certain thickness and good blood perfusion is a necessary condition for PBR surgery, so more caution should be taken in the selection of patients. However, in patients with Poland

syndrome, the skin flap on the affected side is usually thin, so it may be more prone to complications such as postoperative flap ischemia and poor wound healing, resulting in failure of reconstruction. In summary, the choice of implant breast reconstruction in patients with Poland syndrome is limited, the reconstruction is more difficult, and there may be a higher incidence of postoperative complications.

### **Reviewer B**

**Comment 1:** First of all, it is not written at the beginning of the case report which side

(right or left) of the female patient is affected. Besides Poland syndrome, there is hypoplasia of the pectoralis major muscle and therefore also hypoplasia of the breast on this side. At the beginning of the case report, we can read there was bilateral hyperplasia of the breast.

**Reply 1:** In this case, the Poland syndrome mainly involved the right limb, with the absence of the right pectoral muscle, bilateral breast asymmetry due to the dysplasia of the right breast, and the short fingers of the right hand. An explanation has been added at the appropriate place in the article.

**Comment 2:** It is written that in CT scans some defect of the right pectoral muscle was described. What kind of defect it was? There are 2 heads of the pectoralis major, the clavicular and the sternocostal, and sometimes the third part – abdominal - is described. Which part was actually missing? Or underdeveloped?

**Reply 2:** The CT scan of the chest of this patient showed that the right pectoralis major and pectoralis minor were all missing. An explanation has been added at the appropriate place in the article.

**Comment 3:** In conclusion, the Authors wrote that “The pathogenesis of Poland syndrome is unknown...” which is actually not true because there are hypotheses of its etiology like SASDS... this sentence needs revision.

**Reply 3:** The etiology of Poland syndrome is currently inconclusive, but it is generally thought to be caused by developmental abnormalities associated with the subclavian artery and branch vessels during the critical 6th week of embryonic development, which results in decreased perfusion on the affected side of the chest wall. The relevant content has been revised in the article.

### **Reviewer C**

**Comment 1:** Please introduce Poland syndrome in both abstract and introduction, since most readers are unfamiliar with this condition.

**Reply 1:** The introduction of Poland syndrome has been added at the appropriate places in the article.

**Comment 2:** Were there any pre-existing complaints suggesting Poland syndrome? Was there a positive family history?

**Reply 2:** The patient self-reported that the right anatomical abnormalities caused by

Poland syndrome did not significantly affect her daily life. There was no family history of Poland syndrome. The explanations have been added to the appropriate place in the article.

**Comment 3:** Why was decided to perform a modified radical mastectomy instead of a breast-preserving treatment? What was the breast size? Please comment.

**Reply 3:** In the case of Poland syndrome with defects such as the absence of pectoral muscle and hypoplasia of the chest wall, thoracic radiation therapy on this side is required if breast-preserving treatment is performed on her. We are concerned that the absence of pectoral muscle and partial absence of chest wall may lead to increased incidence of radiation lung injury, post-radiation cardiovascular toxicity, and other complications, but there is still a lack of research to confirm. In addition, the patient's primary tumor was nearly 5cm before neoadjuvant therapy, and the patient had no strong desire to preserve the breast. Taking all these factors into consideration, we performed a modified radical mastectomy of the right breast. I am sorry that the patient's breast size was not measured in detail before surgery.

**Comment 4:** Please provide cTNM and pTNM classifications.

**Reply 4:** The clinical TNM classification was cT<sub>2</sub>N<sub>0</sub>M<sub>0</sub>. The postoperative pathological classification after neoadjuvant therapy was pT<sub>1</sub>N<sub>0</sub>M<sub>0</sub>. The explanations have been added to the appropriate place in the article.

**Comment 5:** Was preoperative skin involvement present?

**Reply 5:** There was no preoperative skin involvement present. An explanation has been added at the appropriate place in the article.

**Comment 6:** Were there any specific concerns or challenges during the reconstruction phase of the surgery? What is the role of autologous reconstruction modalities, especially in this patient category?

**Reply 6:** For patients with Poland syndrome, the choice of breast reconstruction methods is very limited, because the implant prosthesis reconstruction method is more commonly used in clinical practice. However, due to the absence of pectoral major and minor muscles in such patients, subpectoral breast reconstruction is usually not feasible. Prepectoral breast reconstruction has high requirements on the flap of the patient, which requires a certain thickness and good blood perfusion. In patients with Poland syndrome, the skin flap on the affected side is usually thin, and the incidence of postoperative complications such as flap ischemia and poor wound healing is higher.

The donor areas of autologous tissue in breast reconstruction mainly include the abdomen, back, buttock, thigh, etc. The selection of different skin flaps depends on the patient's donor area, risk factors, the ability and experience of the medical team, and the patient's willingness. After autologous reconstruction, the contours of the breast are

natural and soft, and the long-term satisfaction of patients is high. Autologous reconstruction is especially suitable for patients who have received radiation therapy in the past, have thin chest wall flaps or have delayed reconstruction. Patients with Poland syndrome often have a thin chest wall flap on the affected side, so autologous breast reconstruction is more suitable for these patients. However, autologous tissue reconstruction may involve microsurgical techniques and requires an experienced multidisciplinary team, including radiology, breast surgery, plastic surgery and specialist nurses, etc. At the same time, there is a long learning curve for surgeons to master autologous tissue breast reconstruction techniques.

Considering the above factors and the patient's personal wishes, breast reconstruction was not performed on this patient.

**Comment 7:** Do you have any advice for follow-up? Would you suggest a standard follow-up regimen, or are there points of attention?

**Reply 7:** At present, no relevant studies have shown that Poland syndrome has a significant impact on the adjuvant treatment of breast cancer patients after surgery, therefore, we will formulate a standard follow-up treatment plan for this patient according to the international guidelines.

**Comment 8:** Why are patients with Poland syndrome and breast cancer more prone to lymph node metastasis? Please elaborate and add more references, or nuance to this statement.

**Reply 8:** This conclusion is only based on a case report and literature review by Zhang F et al. No further reference materials have been found to prove this conclusion, and the statement in this paper has been nuanced.

**Comment 9:** You state that adjuvant radiotherapy is standard after breast-conserving treatment as well as after mastectomy, which is incorrect. Adjuvant radiotherapy is indeed standard after breast-conserving surgery, however after mastectomy, it is only given in extensive tumors.

**Reply 9:** Postoperative adjuvant radiotherapy is the standard treatment for breast cancer patients who have undergone breast-conserving surgery. Patients with stage T3 to 4 or with positive axillary lymph nodes also need radiation therapy after mastectomy. The relevant content has been revised in the article.

**Comment 10:** What is your hypothesis on the correlation between Poland syndrome and breast cancer? Or is it just a coincidence and should you focus more on stressing the importance of treatment caveats on this rare combination to the readership?

**Reply 10:** Poland syndrome is a congenital disease, and there are also many pathogenic factors of breast cancer, so far there is no clear etiological link between them. In addition to breast cancer, some cases of Poland syndrome combined with other

malignancies have been reported in the literature, and perhaps we should pay attention to whether congenital anatomical abnormalities cause an increased risk of malignancies. However, we need a large number of cases to explore this hypothesis.

**Comment 11:** Was informed consent obtained from your patient?

**Reply 11:** We have obtained the informed consent of our patient, which is supplemented at the end of the article.