Evolution of chest wall reconstruction for malignancy in a resource-limited setting: a retrospective single-center review of cases in the Philippines

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Background and Objectives

Surgical reconstruction approaches are indispensable in restoring chest wall integrity, preserving pulmonary mechanics, protecting intrathoracic structures and promoting cosmesis to ameliorate full-thickness chest wall defects after oncologic resection. While there is now a wide plethora of advanced and novel options for chest wall reconstruction with improved biocompatibility, durability and precision-fitting properties, access to such innovations in resource-limited settings is often constrained by cost, infrastructure and experience/training. This study aimed to describe the characteristics and outcomes of patients who recently underwent one of various chest wall reconstruction approaches at the Philippine General Hospital (PGH).

Methods

A retrospective chart review of adults (aged 19 years and above) who underwent chest wall reconstruction through birdcage reconstruction, three-dimensional (3D)-printed bone cement molds, titanium plates & screws or 3D-printed polyetheretherketone (PEEK) neorib implants from 1 January 2022 to 31 July 2025 was performed. Demographic & preoperative characteristics, operative techniques & findings, post-operative course and outcomes until 30 days after initial hospital discharge were noted and summarized.

Results

A total of 17 cases satisfying the eligibility criteria were reviewed. The median (interquartile range or IQR) age of the patients was 53 (48-57) years and 88.2% (n = 15) were female. Majority (n = 13, 76.5%) were preoperatively diagnosed with breast mass (phyllodes tumor or stage IIIB breast carcinoma). Neoplasm recurrence and direct invasion were the indications for chest wall reconstruction in 41.2% (n = 7) and 70.6% (n = 12) of cases, respectively. Unilateral chest wall involvement was noted in 76.5% (n = 13) cases, with tumor ulceration observed in 29.4% (n = 5) patients. The median (IQR) tumor length and chest wall defect area were 13 (8-18) cm and 130 (108-192) cm^2, respectively. While majority of resections involved sternum and ribs (n = 12, 70.6%) or ribs only (n = 5, 29.4%), further involvement of manubrium and clavicle was necessitated in two cases. Birdcage reconstruction was performed in four cases (23.5%), 3D-printed bone cement molds were utilized in six cases (35.3%), titanium plates & screws were used in six cases (35.3%) and 3D-printed PEEK implants were employed in one patient. The number of ribs reconstructed was two in most cases (range: 1-3). Muscle flap and split-thickness skin graft were performed in 82.4% (n = 14) patients; the rest were only subjected to muscle flap only. The median (IQR) operative time was 14.5 (13.0-16.4) hours. Post-operatively, three patients (17.6%) experienced flap necrosis, one patient died from heart failure and one patient spent 86 days before being discharge alive (49 days spent in critical care) due to thyroid storm, adrenal crisis and pneumonia. Repeat operation was required in two (11.8%) patients and no further death within 30 days post-discharge was noted.

Conclusions

Structural, functional, post-operative, aesthetic and survival outcomes were acceptable in this cohort of chest wall reconstruction patients in our resource-limited setting. Careful consideration of the patient's comorbidities remains essential for resource allocation and prognosis. Future endeavors should include comparative effectiveness and cost-effectiveness analyses of outcomes across all available chest wall reconstruction modalities.