



Abstract

- Breast reconstruction can be performed using either implant-based or autologous (“flap”) reconstruction, during or after the mastectomy/lumpectomy procedure. In implant-based reconstruction, the implant can be placed either underneath the chest muscle (subpectoral) or over it (prepectoral).
- Prepectoral implant-based breast reconstruction can be a valuable approach, contributing significantly to the recovery and overall quality of life for patients after mastectomy.
- Often, the use of acellular dermal matrix (ADM) is employed during this procedure; the use of ADM has been debated, with complication rates and cost-effectiveness being common areas of discussion.
- This analysis aims to offer a comprehensive cost-effective analysis of prepectoral implant-based breast reconstruction, with and without ADM.

Methodology

- We performed a decision tree analysis to assess the costs, complication rates, and quality adjusted life months (QALMs) associated with prepectoral breast reconstruction with and without ADM.
- Costs were derived from Medicare reimbursement rates (FY2023) using the third-party payer perspective for physicians and hospitals.
- QALMs were determined from the literature, and serve as a measure of effectiveness. QALM of 1 represents one month of perfect health, while a QALM of 0 is equivalent to death. QALMs were measured using six months as a maximum.
- Statistical analyses were completed using one-way, two-way, and Monte Carlo probabilistic sensitivity tests.

Results

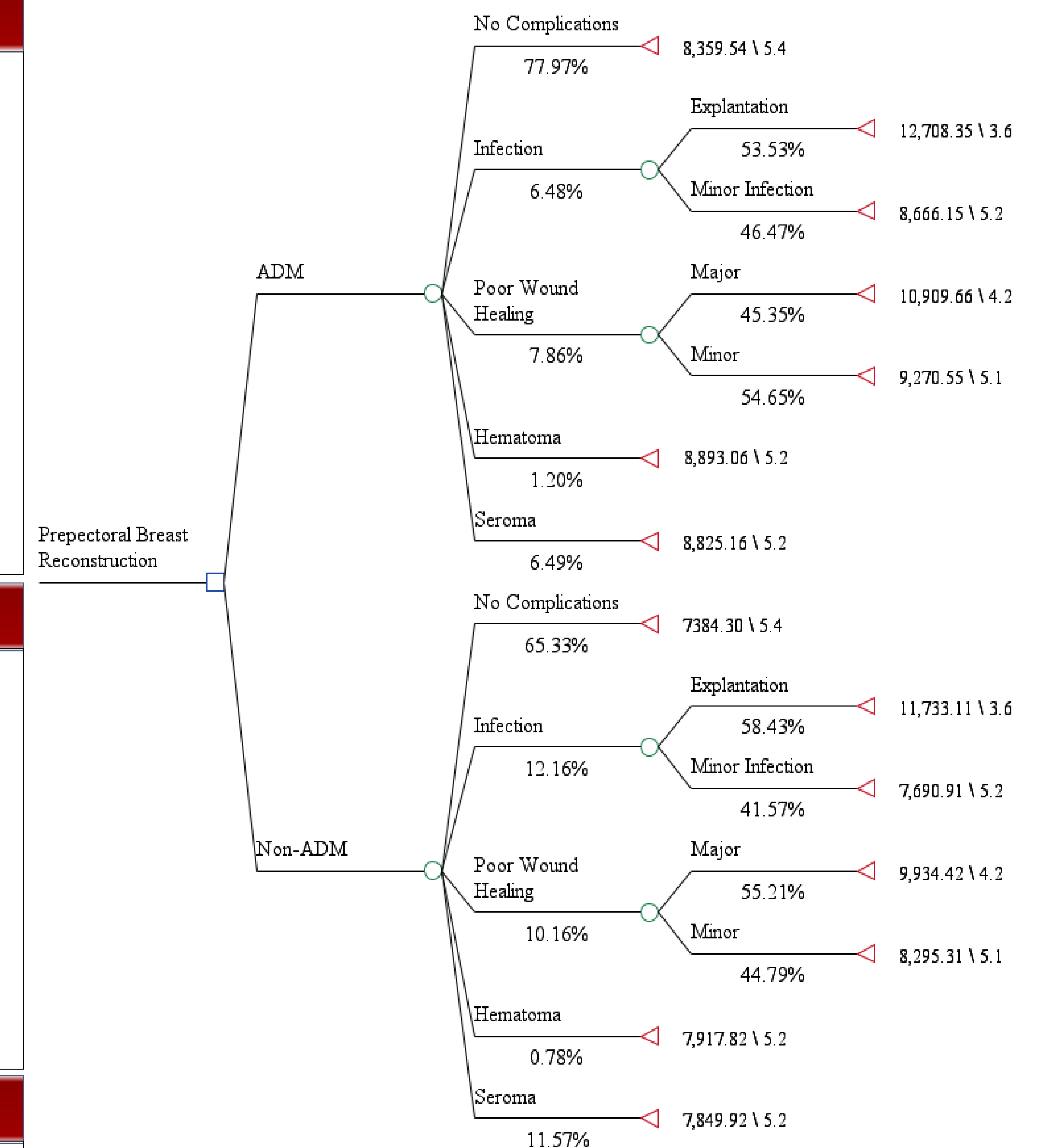
- Base Case Analysis:** Prepectoral breast reconstruction with ADM had a cost of \$8,256.26 with a QALM of 5.21. Non-ADM prepectoral breast reconstruction had a cost of \$8,269.48 with a QALM of 5.04.
- Sensitivity Analyses:** One-way and two-way demonstrated that there were no scenarios in which non-ADM was more cost-effective than ADM. Monte Carlo revealed that ADM costs ranged from \$8,150 to \$8,450, with QALMs between 5.15 and 5.26, while non-ADM costs ranged from \$8,125 to \$8,500, with QALMs between 4.96 and 5.10.

Discussion

- Our study found that prepectoral breast reconstruction with ADM is more cost-effective compared to without ADM, considering both cost and QALMs. This preference for ADM was consistent across all sensitivity analyses. Additionally, the data suggests that, despite higher initial costs, ADM is associated with fewer complications, which may reduce overall healthcare costs by decreasing hospital stays, repeat surgeries, and postoperative care.

Conclusion

- Based on our analysis, prepectoral breast reconstruction with ADM offers improved quality-of-life and is more cost-effective than non-ADM reconstruction, likely due to lower complication rates. More randomized control trials are necessary to thoroughly compare outcomes between these methods.



- Figure 1.** Decision tree model used for analysis. The 2 major treatment modalities studied in our analysis and included in the tree include prepectoral breast reconstruction with and without the use of ADM.

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References:

[1] Siegel, RL, Miller, KD, Wagle, NS, Jemal, A. Cancer statistics, 2023. *CA Cancer J Clin.* 2023; 73(1): 17-48. [2] Kim LS, Park T, Berger ER, Golshan M, Greenup RA. Editorial Comment on: One-Year Experience of Same-Day Mastectomy and Breast Reconstruction Protocol. *Ann Surg Oncol.* 2022 Sep;29(9):5361-5363. doi: 10.1245/s10434-022-12021-1. Epub 2022 Jul 14. PMID: 35834143; PMCID: PMC9281278. [3] Berlin NL, Chung KC, Matros E, Chen JS, Momoh AO. The Costs of Breast Reconstruction and Implications for Episode-Based Bundled Payment Models. *Plast Reconstr Surg.* 2020 Dec;146(6):721e-730e. doi: 10.1097/PRS.0000000000007329. PMID: 33234949; PMCID: PMC8503817. [4] Lohmander F, Lagergren J, Johansson H, Roy PG, Brandberg Y, Frisell J. Effect of Immediate Implant-Based Breast Reconstruction After Mastectomy With and Without Acellular Dermal Matrix Among Women With Breast Cancer: A Randomized Clinical Trial. *JAMA Netw Open.* 2021;4(10):e2127806. doi:10.1001/jamanetworkopen.2021.27806