PATIENT MEDICAL RECORD — SUMMARY CHART

Patient Demographics

Field	Value
Name	Angela Marie Thompson
DOB	June 21, 1976 (Age 49)
Sex	Female
MRN	MCC-2025-40221
Insurance	BCBS of Illinois — BCBS-IL-991347820
PCP	Dr. Karen Liu, MD — Lakeview Internal Medicine
Oncologist	Dr. Emily Nakamura, MD — Midwest Cancer Center
Radiation Oncologist	Dr. Raj Patel, MD, PhD — Midwest Cancer Center

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Chief Complaint

"I was diagnosed with breast cancer last month. My radiation oncologist recommends proton therapy because I have a heart condition and the tumor is on my left side."

History of Present Illness (HPI)

Ms. Thompson is a 49-year-old female diagnosed with **left-sided invasive ductal carcinoma of the breast** following routine screening mammography on February 10, 2026. She underwent lumpectomy on March 12, 2026, and is now in the adjuvant treatment planning phase.

Cancer Diagnosis & Staging

Parameter	Value
Tumor type	Invasive ductal carcinoma, left breast
TNM Stage	T2N1M0 — Stage IIB
Tumor size	3.2 cm
Lymph nodes	2/14 sentinel nodes positive (macrometastases)
Grade	2 (moderately differentiated)
ER/PR	ER+ (95%), PR+ (80%)
HER2	Negative (IHC 1+)
Ki-67	22%
Margins	Negative (closest margin 4mm)

Oncotype DX	Recurrence Score: 24 (intermediate)

Treatment Plan (Multidisciplinary Tumor Board, March 20, 2026)

1. ✅ Lumpectomy — completed March 12, 2026
2. ⏳ Adjuvant chemotherapy — TC ×4 cycles (starting April 28, 2026)
3. ⏳ Adjuvant radiation — **proton beam therapy recommended** (see rationale below)
4. ⏳ Endocrine therapy — Anastrozole ×10 years

Cardiac History — KEY FACTOR

Ms. Thompson has a **significant cardiac history** that is central to the proton therapy recommendation:

Condition	Details
Mitral valve prolapse	Diagnosed age 32, moderate mitral regurgitation
Paroxysmal atrial fibrillation	Diagnosed 2022, rate-controlled on metoprolol
Prior myocarditis	Viral myocarditis in 2019, recovered, LVEF returned to 55%
Baseline LVEF	55% (echocardiogram, March 5, 2026) — LOW-NORMAL
Coronary calcium score	85 Agatston units (elevated for age/sex)

Cardiology clearance note (Dr. Amir Hassan, MD, March 8, 2026):

> *"Given Ms. Thompson's history of myocarditis, mitral regurgitation, paroxysmal AFib, and borderline LVEF of 55%, she is at **elevated baseline cardiac risk**. Any additional cardiac radiation exposure should be minimized. I strongly recommend proton therapy over conventional photon radiation if adjuvant chest wall/breast radiation is planned. Even modest reductions in mean heart dose (MHD) are clinically significant in this patient given her pre-existing cardiac substrate."*

Radiation Oncology Evaluation (March 25, 2026)

Dr. Raj Patel, MD, PhD:

Dosimetric Comparison (Treatment Planning)

Parameter	IMRT (Photon)	Proton Beam
Mean Heart Dose (MHD)	4.8 Gy	0.3 Gy
LAD artery max dose	22 Gy	1.2 Gy
Left lung V20	18%	6%
Contralateral breast dose	1.8 Gy	0.1 Gy
Target coverage (PTV D95)	95%	97%

Rationale for Proton Therapy

> *This patient presents a compelling clinical case for PBRT over photon-based RT:*
>
> 1. ***Pre-existing cardiac disease:*** *Mitral regurgitation, AFib, prior myocarditis, and borderline LVEF of 55%. Per Darby et al. (NEJM 2013), the risk of major coronary events increases linearly with MHD — 7.4% per Gray. At 4.8 Gy MHD with photon RT, her estimated excess cardiac risk is ~35%. At 0.3 Gy with PBRT, the excess risk is ~2%.*
> 2. ***Young age (49):*** *Long time horizon for late cardiac effects. Excess cardiac mortality from RT typically manifests 10-20 years post-treatment.*
> 3. ***Left-sided tumor with node-positive disease:*** *Regional nodal irradiation (including IMN chain) is indicated per NCCN guidelines for N1 disease, which further increases cardiac exposure with photon techniques.*
> 4. ***Planned anthracycline chemotherapy (TC regimen includes doxorubicin consideration):*** *Additional cardiotoxicity risk from systemic therapy.*
> 5. ***Dosimetric comparison is dramatic:*** *16× reduction in MHD, 18× reduction in LAD max dose.*
>
> *While I acknowledge the absence of completed Phase III RCT data specifically for breast cancer PBRT, the physics of proton dose deposition (Bragg peak) is well-established, and the dosimetric superiority is not disputed by any professional society. Multiple peer-reviewed publications support PBRT for patients with left-sided breast cancer and cardiac risk factors, including Mutter et al. (IJROBP 2021), Stick et al. (Acta Oncologica 2020), and the PTCOG consensus guidelines.*

Medications

Medication	Dose	Frequency
Metoprolol succinate	50 mg	Daily
Apixaban	5 mg	BID
Anastrozole	1 mg	Daily (planned, not yet started)

Relevant Past Medical History

- Mitral valve prolapse with moderate MR (diagnosed 2008)
- Paroxysmal atrial fibrillation (diagnosed 2022)
- Viral myocarditis (2019, recovered)
- No prior cancer
- No prior chest radiation
- Appendectomy (2001)

Social History

- Occupation: Elementary school teacher
- Non-smoker, no alcohol
- Lives with husband and 2 children (ages 12, 15)
- Family hx: Mother — breast cancer at age 58 (survived), Father — MI at age 64
- BRCA1/2 testing: Negative