Long-term outcomes and toxicities of Doxorubicin–Cyclophosphamide in breast cancer: a McGill University Health Centre experience, 100-month interim analysis

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Introduction

- Doxorubicin-cyclophosphamide (AC) has remained a cornerstone of curative-intent breast cancer therapy for over four decades.[1-3]
- Long-term data and toxicity data remain limited in non-clinical trial patients.
- Chronic complications such as chemotherapy-induced cardiomyopathy (CIMP) and secondary hematologic malignancies have major quality-of-life impacts.[4-6]
- **Objective**: To assess the efficacy and toxicity of AC chemotherapy in a real-world cohort of breast cancer patients with a median follow-up of 8.1 years.

Methods

- Retrospective descriptive analysis of a prospectively maintained institutional cohort
- Included breast cancer patients treated with adjuvant or neoadjuvant AC (doxorubicin 60 mg/m² + cyclophosphamide 600 mg/m²) at McGill University Health Centre, 2016–2025; median follow-up time of 8.1 years.
- **Primary outcomes included:** metastatic recurrence (rate and site), all-cause mortality, cardiotoxicity, and hematologic malignancies.
- Subgroup analyses were conducted by age, stage, and tumor subtype.

Demographics

Table 1. Breast Cancer Patients Receiving AC Chemotherapy

Characteristic		All Patients (n=98)
Age (years)	Mean ± SD	60.7 ± 12.0
BMI	Mean ± SD	28.8 ± 7.0
Histology	Invasive ductal carcinoma	86 (87.8%)
	Invasive lobular carcinoma	2 (2.0%)
	Invasive mammary carcinoma	7 (7.1%)
	Other	3 (3.1%)
Tumor Markers	ER positive	60 (61.2%)
	HER2 positive	27 (27.6%)
	Triple Negative	17 (17.3%)
Stage	I	17 (17.3%)
	II	55 (56.1%)
	III	19 (19.4%)
	IV	7 (7.1%)

Results

Figure 1: Long-Term Overall Survival

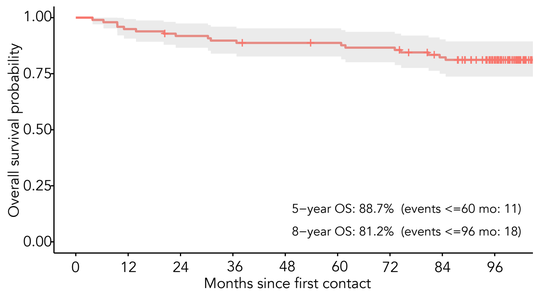
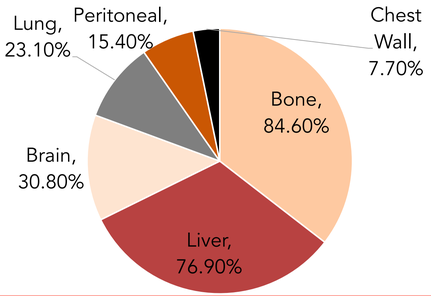


Figure 2: Site Distribution Among Metastatic Recurrences



Results

Table 2. Multivariable Cox Regression for Overall Survival

Variable	HR (95% CI)	p-value
Age	1.00 (0.96-1.04)	0.82
Stage	0.11 (0.04-0.33)	<0.001
Tumor subtype	2.05 (0.71-5.91)	0.18

Table 3. Recurrence Rates

Group	Metastatic events	Rate (%)	Time to metastatic event (median)
N=98	13	14.2	40.1 months

Cardiotoxicity and Hematologic Complications

- The cardiotoxicity rate was 1.0%, with one patient developing CIMP-defined heart failure (LVEF 10–15%) and requiring coronary care unit admission.
- No secondary hematologic malignancies were observed.

Conclusion

- 100-month (8.1-year), prospectively collected real-world data confirm outcomes reported in clinical trials.
- Favorable long-term survival and low metastatic rates observed.
- Acceptable long-term safety supports continued use of AC chemotherapy in high-risk patients.
- The incidence of CIMP was rare but clinically relevant.

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