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ISTITUTO ROMAGNOLO PER LO STUDIO DEI TUMORI DINO AMADORI

IMPACT OF A NOVEL BONE HEALTH DEDICATED OUTPATIENT CLINICS FOR MANAGING CANCER TREATMENT-INDUCED BONE LOSS: A PROPENSITY-SCORE MATCHING STUDY

HSD55

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INTRODUCTION AND OBJECTIVES

Aromatase inhibitors are the most frequently used hormonal therapy in postmenopausal women with surgically treated breast cancer (BC) with positive hormone receptors [1]. While advancements in therapies for hormone-sensitive carcinomas, such as BC, have increased disease-free survival rates and overall survival, they also reduce circulating sex hormone which may lead to a pathological condition known as CTIBL (Cancer Treatment Induced Bone Loss), a form of secondary osteoporosis that results in increased bone resorption and, consequently, a higher risk of fractures [2]. Since 2014, IRST Research Cancer Hospital (Meldola, Italy) has established the first **outpatient clinic dedicated to bone health** in the Romagna district. This service offers the best-tailored treatment to prevent CTIBL. The primary objective is to understand whether the IRST organizational model has a positive impact on patient health in terms of adherence to pharmacological treatments and the appropriateness of the care pathway. A propensity-score matching (PSM) study was developed to assess the impact of the IRST organizational model on bone health.

METHODS

This retrospective observational study analyzed incident patients with a diagnosis of non-metastatic breast cancer who underwent surgical treatment in Emilia Romagna between 2014 and 2022. The patients were identified through administrative data. Patients in oncological follow-up in the Romagna district were divided into two groups: 1) patients treated at IRST (with a dedicated bone health clinic) and 2) a control population followed at other healthcare facilities without such a clinic. The patients were followed from the date of surgery until December 2022 or until death. To reduce selection bias, the **Propensity Score Matching (PSM)** method was used to balance the cohorts for age, tumor type, and therapies received. This analysis mainly focused on analysing the persistence of bone health treatments and the appropriateness of the therapeutic pathway. Specifically, the time-to bone health treatment strat was estimated using the Kaplan-Meier method. Additionally, a Cox proportional hazards regression model was developed to identify factors predisposing the initiation (and timing) of bone health treatment. Lastly, to determine the determinants associated with the likelihood of starting the treatment under analysis, a logistic regression model was used.

RESULTS

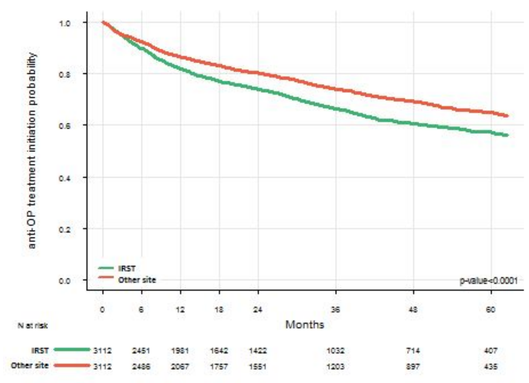
A total of 8,021 patients were initially enrolled in the study, of which 3,112 patients (38.8%) were treated at IRST and 4,909 (61.2%) were treated at other facilities in Romagna. After the PSM, 3,112 patients were included in each of the two cohorts. More than 30% of patients under care of our Institute (with the outpatient clinic dedicated to bone health) received anti-osteoporotic drugs compared to 24.8% of patients treated in other centres of our sub-region ($p < 0.0001$). As reported in **Table 1**, **patients under IRST care resulted to be a 39% more likely to receive anti-osteoporotic** therapies than the control group (OR: 1.39; 95 %CI: 1.24-1.57). Furthermore, we observed that patients with invasive tumors were 77% more likely to initiate bone therapy than those with in situ tumors (OR: 1.77; 95% CI: 1.24-2.58).

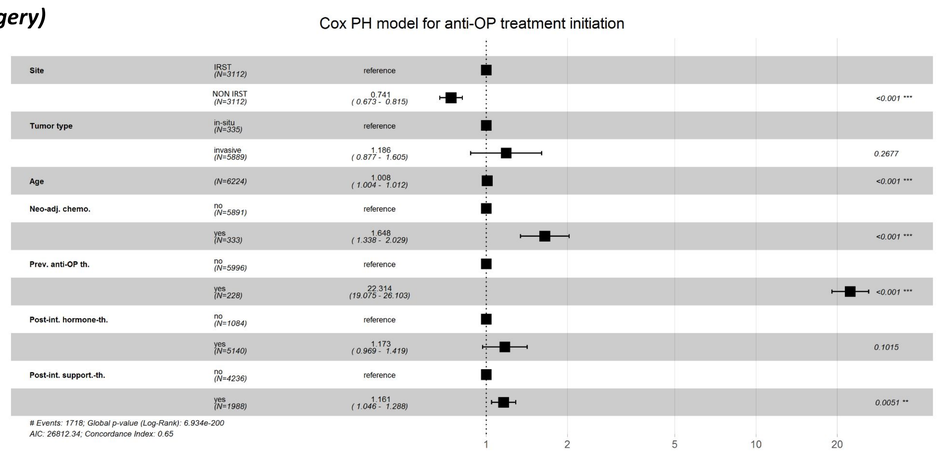
Table 1: Factors associated with the initiation of bone health treatment

Logit model						
Parameter	**Odds Ratio (OR)**	**SE**	**95% CI**		**Z**	**p-value**
			Lower limit	**Upper limit**		
(Intercept)	0,026	0,007	0,016	0,042	-14,343	<0,0001
Site (IRST)	1,393	0,085	1,236	1,571	5,431	**<0,0001**
Tumor type (invasive vs. in-situ)	1,766	0,331	1,237	2,585	3,032	**0,0024**
Age	1,004	0,002	0,999	1,008	1,519	0,1288
Previous anti-OP treatment	61,557	16,900	37,091	109,490	15,007	**<0,0001**
Post-surgery chemotherapy	1,470	0,147	1,209	1,789	3,853	**0,0001**
Post-surgery ormone-therapy	4,887	0,574	3,902	6,188	13,501	**<0,0001**
Post-surgery supportive-therapy	1,349	0,130	1,116	1,628	3,107	**0,0019**

Among patients treated with anti-osteoporotic drugs, the **initiation of treatment occurred one year earlier among IRST patients**. The first quartile (25th percentile) of IRST patients begins bone health treatment within 22 months after surgery, while patients not treated at IRST start it a year later, approximately 34 months after surgery (see **Fig. 1**). As expected, the early beginning of bone health therapy was influenced by age ($p < 0.001$) and neo-adjuvant chemotherapy treatment ($p< 0.001$).

Fig. 1:Time to initiation of bone health therapy (from surgery)





CONCLUSIONS

The IRST model demonstrates responsiveness to bone health needs in cancer patients. In the future, it would be desirable to extend the implementation of this organizational model in other contexts, also for establishing a CTIBL management integrated pathway in cancer patients.

References

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