Albumin to Alkaline Phosphatase ratio as new early predictive marker of nodal pathologic complete response in nodal positive breast cancer patients undergoing neoadjuvant chemotherapy

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Introduction

Depending on the tumor subtype, an axillary pathologic complete response (pCR) is achieved in 20-70% of initially node-positive (cN+) patients undergoing neoadjuvant chemotherapy (NAC). Several nomograms are currently under investigation in order to identify the patients who most likely will respond to NAC. The Albumin to Alkaline Phosphatase ratio (AAPR) is an easily applicable, cost-effective marker under investigation as a predictor of response in several solid cancers. The aim of this study is to evaluate for the first time if the AAPR may predict the axillary response in cN+ breast cancer patients undergoing NAC.

Methods

Nodal-positive breast cancer patients undergoing NAC at the Centro di Senologia della Svizzera Italiana (CSSI), Lugano, have been included in the analysis. Clinical and biochemical variables have been dichotomized. Pre- NAC Albumin and Alkaline Phosphatase values were collected. The AAPR threshold of 0.583 defined patients with high or low AAPR. The primary outcome was the pCR in the axilla. Chi-squared test and univariate logistic regression analysis were performed to identify differences between patients with high and low AAPR.

Results

Full data were available for 45/78 patients. Nodal pCR was achieved in 20/45(44.4%) patients. 36/45(80%) patients had an AAPR>0.583. A statistically significant difference in axillary pCR between low and high AAPR group was found (p-value 0.03, OR 0.129,CI 0.005-0.835).

		Number of patients	AAPR < 0.583	AAPR ≥ 0.583	p value Fisher's Exact Test	OR with 95 % CI	OR CI lower margin	OR CI upper margin
Age (med. = 51, 24-87)								
	< median	23 (51.1 %)	3 (6.7 %)	20 (44.4 %)				
	≥ median	22 (48.9 %)	6 (13.3 %)	16 (35.6 %)	0.284	0.416	0.073	1.906
Histological type								
	ductal	39 (86.7 %)	8 (17.8 %)	31 (68.9 %)				
	other	6 (13.3 %)	1 (2.2 %)	5 (11.1 %)				
					1.000	1.175	0.149	34.343
cT								
	T1-2	30 (66.7 %)	4 (8.9 %)	26 (57.8 %)				
	T3-4	15 (33.3 %)	5 (11.1 %)	10 (22.2 %)				
					0.135	0.319	0.063	1.493
cN								
	N1	31 (68.9 %)	6 (13.3 %)	25 (55.6 %)				
	N2-3	14 (31.1 %)	3 (6.7 %)	11 (24.4 %)				
					1.000	0.867	0.183	5.014
Histological grade								
	1-2	10 (22.2 %)	1 (2.2 %)	9 (20 %)				
	3	35 (78.8 %)	8 (17.8 %)	27 (60 %)				
					0.659	0.421	0.015	2.897
Hormone receptor status								
	negative	12 (26.7 %)	2 (4.4 %)	10 (22.2 %)				
	positive	33 (73.3 %)	7 (15.6 %)	26 (57.8 %)				
					1.000	0.778	0.093	4.069
HER2 status								
	negative	21 (46.7 %)	5 (11.1 %)	16 (35.6 %)				
	positive	24 (53.3 %)	4 (8.9 %)	20 (44.4 %)				
					0.713	1.537	0.337	7.473
Ki67 expression								
	< 20	2 (4.4 %)	0 (0 %)	2 (4.4 %)				
	≥ 20	43 (95.6 %)	9 (20 %)	34 (75.6 %)				
					1.000	NA	NA	NA
pCR in primary tumor								
	ypT0	22 (48.9 %)	2 (4.4 %)	20 (44.4 %)				
	ypT≥1	23 (51.1 %)	7 (15.6 %)	16 (35.6 %)				
					0.135	0.246	0.030	1.227
pCR in lymphnodes								
	ypN0	20 (44.4 %)	1 (2.2 %)	19 (42.2 %)				
	ypN≥1	25 (55.6 %)	8 (17.8 %)	17 (37.8 %)				
					0.030	0.129	0.005	0.835

Conclusion

This pilot study suggests that the pre-treatment AAPR might be an early predictor of axillary response in cN+ breast cancer patients undergoing NAC. Further studies with larger sample size are needed to confirm these encouraging preliminary results.

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