

Open Access Article **A bicentric study**

Breast milk suction pumping and a possible relation to breast cancer: A bicentric study

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SUMMARY: In a bicentric clinical study of 343 patients who consulted for breast problems, we collected a questionnaire regarding the use or not of breast milk suction pump during their previous breast feeding. Our results calculate with the **Fisher's Exact Test** found that in breast cancer patients the previous use of the pump was much more frequent than in patients without breast cancer ($p < 0.003$). A possible role of chronic inflammation created by the breast milk pump could be evoked to explain this result. This impressive finding should be more investigated in large series to confirm or not if breast milk pump using could be considered as a risk of breast cancer.

INTRODUCTION

Breast is in mammals the organ which is devoted to produce milk for breast feeding. In pathological breast discharge breast pump could be used to increase the quantity of liquid from the nipple and improve the diagnosis (Zervoudis 2003) (1). Moreover breast feeding decrease breast cancer risk if is performed at least twelve months (Islami 2015) (2). On the other hand during breast feeding complications could occur such breast congestion and mastitis. These complications decrease the excretion of the milk, and the woman needs often to use a breast milk suction device to evacuate the restrained milk in the breasts. Considering that inflammatory factors contribute to genetic instability and subsequent cancer predisposition, it is strongly hypothesized that breast cancer could be linked to chronic inflammation.

Among others, it is suggested that miRNAs are the possible link between inflammation and tumorigenesis (Bahiraee et al 2019) (3). Some factors, including obesity, probably exert their carcinogenic actions through multiple pathways of chronic inflammation. It is well known that obesity initiates insulin resistance (Shoelson et al 2006) (4), thus, increasing levels of insulin, which is an inflammatory agent and IGF (Insuline Growth Factors) which could be involved in tumorigenesis. The Inflammation may be represented by biomarkers of early pathologic changes in breast cells and be associated with risk for the development of breast cancer (Lithgow & Covington 2005) (5). As an example, C-reactive protein (CRP) can «estimate» low-grade chronic inflammation and rise in response to a tissue injury and tissue injury inflammation. Several epidemiologic studies have revealed the association between CRP and breast cancer risk (Guo et al 2015) (6) and it was suggested that elevated CRP raises the risk of breast cancer recurrence and predicts breast cancer survival. Considering that breast pump is often related to (marginal) tissue injuries and accompanying inflammation, a causal relation of breast pump using for breast feeding, and breast cancer should be investigated.

MATERIAL AND METHODS

Three hundred and forty three women were collected in two hospitals: Rea Hospital and Alexandroupolis University Hospital in Greece, during the patient's consultations in the breast clinics. The medical history and the questions relative to breast feeding were completed in all the patients. The patients were divided in two groups according to the presence or not of breast cancer in their medical history. Two hundred and three women had a history of breast cancer and hundred forty women without such history were used as controls. Among others characteristics linked to breast cancer, we explored in this study the presence or the absence of breast milk pump using during breast feeding. The two groups of women were similar to other risk factors related to breast cancer, including age, familial breast cancer, body mass index, alcohol use, breast mammographic density, hormonal status and history of breast biopsies.

RESULTS

Our results were calculated with the **Fisher's Exact Test** (Tables 1-2). We found that in the group of **patients without breast cancer** (140 women) 30% have used breast pump and 70% have no used it during breast feeding. On the contrary in the group of **patients with breast cancer** (203 women), 45.8% of the women have used breast pump during breast feeding and 54.2 % have not used it. In our study the patients with breast cancer used more the mammary

milk pump that the patients without breast cancer ($p < 0.003$).

Also the majority of the patients who used breast milk pump did it for several months (>3months) with many times daily suction of the nipple with the device. Considering these preliminary data with probably inadequate number of patients in each group, it may be concluded that an association between breast milk pump and breast cancer could not be excluded.

DISCUSSION

It is well known that breast pump could be associated with injuries and this is a general finding irrespective of mothers' socioeconomic characteristics (Qi et al 2014) (7). It could be hypothesized that breast pump, through injuries and inflammation of the breast could be related to an increase of breast cancer risk. Actually, accepting the strong link between inflammation and tumorigenesis in cell level (Bahiraee et al 2019) (3) and the epidemiologic links to breast pump injury and inflammation, breast pumping could be a promoter factor to develop breast cancer. The results of our preliminary data could be interpreted as a strong relation between breast pump and breast cancer. However, further studies with greater number of patients in a multivariate analysis are needed for final conclusions and possible altered instructions related to breast pump. Waiting further investigation of the above relations, breastfeeding mothers may reduce their risk of breast injury with the use of breast pump following some simple advices. As an example, the avoidance of battery-operated pumps may reduce the incidence of breast pump injuries (Qi et al 2014)(7). However, considering that breast pump is generally used for a short duration in reproductive age women and that breast cancer is mainly related to increased ages, this relation is not easy to be proved «beyond any reasonable doubt».

Despite breast feeding is a classical factor of breast cancer protection when it is performed for more that 1 year, may be the chronic inflammation created when breast pump is used could have a contrary effect.

CONCLUSION

Breast feeding using a breast pump is in our series correlated with higher rate of breast cancer ma be because the chronic inflammation due to the traumatic procedure. This correlation is not known in the classical medical literature. Further research with larger series is necessary to confirm or not our findings.

Conflicts of Interest: The author declares no conflicts of interest regarding the publication of this paper.

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Table 1: Breast cancer group and no breast cancer group in relation with the using or not of breast milk pump.

Crosstab					
			Use of breast pump		Total
			,00	1,00	
cancer	YES	Count	110	93	203
		ExpectedCount	123,1	79,9	203,0
		% withincancer	54,2%	45,8%	100,0%
		% within breast pump	52,9%	68,9%	59,2%
		% of Total	32,1%	27,1%	59,2%
		Residual	-13,1	13,1	
		StandardizedResidual	-1,2	1,5	
	NO	Count	98	42	140
		ExpectedCount	84,9	55,1	140,0
		% withincancer	70,0%	30,0%	100,0%
		% within breast pump	47,1%	31,1%	40,8%
		% of Total	28,6%	12,2%	40,8%
		Residual	13,1	-13,1	
		StandardizedResidual	1,4	-1,8	
Total		Count	208	135	343
		ExpectedCount	208,0	135,0	343,0
		% withincancer	60,6%	39,4%	100,0%
		% withinbreast pump	100,0%	100,0%	100,0%
		% of Total	60,6%	39,4%	100,0%

Table 2: X square tests.

Chi-Square Tests						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2- sided)	Exact Sig. (1- sided)	Point Probability
Pearson Chi-Square	8,680 ^a	1	,003	,003	,002	
Continuity Correction ^b	8,031	1	,005			
Likelihood Ratio	8,809	1	,003	,003	,002	
Fisher's Exact Test				,003	,002	
Linear-by-Linear Association	8,655 ^d	1	,003	,003	,002	,001
McNemar Test				,772 ^c	,386 ^c	,054 ^c
N of Valid Cases	343					