Relationship Between Stress and Saliva Biomarkers in Breast Cancer Patients Receiving Outpatient Chemotherapy

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Abstract
The Breast cancer is the most frequent type of cancer in women and has increased by westernization of lifestyle. The 30 's - 50' s, breast cancer patients, live with many roles and responsibilities in the company and at home, and they are within a period of stressful diversity. A physiologically active substance which changes depending on the stress state is expected to be used as an objective physiological biomarker of a human stress state. It has been reported that salivary α-amylase and cortisol are useful tools to take stable values in normal times and investigate the effects of stress. This study aimed to clarify whether the biomarkers in saliva was related to mood/emotion of a cancer patient undergoing chemotherapy. Five breast cancer patients being treated by outpatients chemotherapy were recruited. A questionnaire was used to survey the attributes, and level of stress in these patients based on the POMS2 (Profile of Mood States 2nd Edition). Salivary cortisol and salivary α-amylase were measured as salivary biomarkers. There were one subject with a strong negative emotional state and four on average. Salivary cortisol, and α-amylase were not associated with POMS2. Future research should involve larger numbers of patients.

Keywords: cancer, outpatient chemotherapy, saliva biomarkers, stress

Introduction

Due to progress in therapy, cancer chemotherapy has been implemented in outpatient clinics, and the number of patients receiving treatment that is compatible with a social life is increasing. Breast cancer, the most frequent cancer that primarily affects women, is predicted to increase as lifestyle become more Westernized. During their 30s to 50s age, breast cancer patients, live with many roles and responsibilities at work and at home, and they are within stressful diversity. In addition, treatment of breast cancer involves chemotherapy accompanied by mastectomy or hand numbness, which creates a situation where a woman's body image changes and she cannot perform her role in housework, childcare, work, and so on. Many patients are expected to experience high levels of stress by being unable to fulfill their roles in society and at home. Currently, physiologically active substances that change according to stress conditions are expected to be used as objective physiological indicators (biomarkers) of human stress conditions. A biomarker is secreted not only in the blood, but also in saliva. Moreover, saliva is a biochemical endocrine sample that can be collected noninvasively and continuously. Salivary cortisol and α-amylase have been reported to be stable tools in normal situations and to be useful tools to investigate the effects of stress [1) 2)]. Currently, there is no research using salivary biomarkers focusing on patients with breast cancer during outpatient chemotherapy. The purpose of this study is to investigate the relationship between saliva biomarker and patient's stress.

Result and Conclusion

Five breast cancer patients being treated by outpatients chemotherapy were recruited. Two of the participants were working: one who had a spouse (partner) and one without children.

One difficulty with balancing life and treatment was that one hospital was far away. There were three findings related to side effects. The salivary cortisol was 0.077-0.169 μg/dl, and the salivary α-amylase was 37.392-128.576 U/mL. Both salivary cortisol and α-amylase demonstrated variability in each patient.

Based on these results, it is possible that patients undergoing neo adjuvant chemotherapy may feel strong negative emotions, so as we continue to increase the number of participants in the future, we will focus on the results of patients who undergo neo adjuvant chemotherapy.

In the future, it would be necessary to know the secretion pattern of salivary cortisol and α-amylase for each participant.

Table1. POMS2 and biomarkers in saliva result

	Participents	A	B	C	D	E
POMS2 Tscore	Anger-Hostility(AH)	53	40	51	38	38
	Confusion-Bewilderment(CB)	66	46	46	53	38
	Depression-Dejection(DD)	64	41	50	45	45
	Fatigue-Inertia(FI)	54	43	56	49	36
	Tension-Anxiety(TA)	65	42	51	49	46
	Vigor-Activity(VA)	52	40	70	43	36
	Friendliness (F)	55	41	58	60	39
	Total mood disturbance(TMD)	60	44	47	48	43
Biomarkers in saliva	Cortisol(μg/dL)	0.077	0.169	0.128	0.100	0.157
	α-Amylase(U/mL)	53.464	37.392	95.776	128.58	121.03

References

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