A comparison study of saliva content before and after menopause

Ferdous Abass Jabir* ,Buthena Abass Frhan* and Shama Abd-Alazez*

الخلاصة

في السنوات الأخيرة وفي العديد من الحقول الطبية بدأ الاعتماد على فحص اللعاب بدل الدم لأغراض التشخيص يكون أكثر استخدام كونه ومن الناحية الطبية أدق ولا يتسبب بالألم ومن ضمن هذه المجالات استخدامه لتقييم مدى الاستفادة من العلاج الهرموني للنساء بعد سن اليأس .

ما نملكه من المعلومات حول التغيرات المحتمل حدوثها لمكونات اللعاب في المراحل العمرية المختلفة هي قليلة جدا" . ولهذا كان الهدف من هذه الدراسة هي إجراء مقارنة بين محتويات اللعاب للنساء قبل سن اليأس ومحتوياته بعد سن اليأس مركزين في البحث على بعض المتغيرات الكيميائية المهمة لأغراض التشخيص للعديد من الأمراض .

اشتركت في هذا البحث 68 امرآة مقسمات إلى مجموعتين أساسيتين الأولى للنساء قبل سن اليأس وكانت تشمل 34 فتاة وتتراوح أعمارهن بين 18-22 سنة ، وشملت المجموعة الثانية 34 امرأة بعد سن اليأس تراوحت أعمارهن بين 52-66 سنة .. تم جمع العينات من اللعاب لأغراض الفحص (اليوريا ، الكلوكوز ، اليورك اسد وأخيرا" الكولسترول)

أوضحت النتائج إن مستوى اليوريا مع الكولسترول كان عاليا" وبدلالة إحصائية معنوية لدى النساء بعد سن اليأس بينما لايوجد فرق في مستويات (اليورك اسد والكلوكوز P) 51-25 لدى المجموعتين .

Abstract

Background:- In recent year saliva test is used instead of blood test in many medical fields for being more accurate and not invasive, for example it is used for evaluation of the benefit of using hormonal replacement therapy as treatment in post menopausal women.

Objective:- As relatively little is known about the effect of age on salivary composition, the aim of this study is to compare between saliva content before and after menopause for some of biochemical markers which are used for diagnosis of many medical condition and risk groups.

Methods :- Sixty-eight female were participate in this study, divided for two groups the first group consist of thirty-four female in *premenopausal age* and another thirty-four female represent the second group *postmenopausal.*

*AL-Qadisiya University, College of Medicine, Branch of clinical chemistry

Salivary samples were taken to assess urea level, glucose level, uric acid and cholesterol levels.

Results:- The results shows that urea level along with cholesterol level were significantly higher in postmenopausal women (P<0.01) while uric acid and glucose shows no significant difference (P>0.01).

Key words: saliva , menopause.

Introduction

A growing number of dental and medical doctors are finding that saliva provides an easily available non invasive diagnostic medium for a rapidly widening range of disease and clinical situations [1].

The use of saliva in diagnosis is an increasingly important field in dentistry, physiology, internal medicine, endocrinology, pediatric, immunology, clinical pathology, forensic medicine and sport medicine [2]. Some of the drug, hormones and antibodies can be reliably monitored in saliva for example the assays of steroid hormones from saliva are widely used and well validate providing an unstressful sampling instead of venipuncture. Multiple specimens of saliva for steroid hormone analysis can be easily collected by the patient at home to monitor fertility cycles, menopausal fluctuations stress and other diurnal variations [3]. Also some hormones other than steroids have been found to be reflective of their plasma levels and could be considered for salivary monitoring [4].

It has become apparent that many systemic diseases affect salivary gland function and salivary composition. Studies of the effects of systemic diseases on salivary variables have been valuable in understanding the pathogenesis of the disease, but their use as diagnostic markers has been limited [5]. The flow and composition of saliva can be change not only in diseases but also with various stimulation for example nervous stimulation of salivary glands results in increase in both saliva flow and concentration of saliva components like protein, glucose, electrolyte and enzyme. So investigators need to know if the concentrations of substance they intend to measure in saliva are affected by saliva flow rates [6]. In case of menopause, postmenopausal women suffer from many physiological changes that effects many systems

leading to vascular instability, urogenital atrophy in addition to skin and soft tissue changes, all of that can be related to hormonal changes [7]

Salivary measurement of hormones has been performed in clinical research for over 30 years, including studies conducted at the National Institutes of Health (NIH), and it has remained a mainstay in clinical research studies. The hormones most extensively investigated include: estradiol, estrone, estriol, progesterone, dehydroepiandrosterone (DHEA), testosterone and cortisol [8].

Metabolic changes that occur in postmenopausal women due to hormonal changes can also affect the salivary gland function and salivary composition

Subjects and methods

Sixty-eight females were participating in this study they had been informed in details about the nature of the research. All the females were in a healthly status(according to their history and physical examination) no history of blood pressure or diabetes or any other disease conditions, no cigarette smoking and no history of drug use, no history of dental disease. Thirty-four female their age range (18-22) years their weight range (58-65) kg represent the first group *premenopausal* and another thirty-four female their age range (52-66)years their weight range (65-78)kg represent the second group *postmenopausal.*

The whole saliva was collected for five minutes by the subject leaning forward and spitting saliva into test tubes that were kept in crushed ice and immediately after collection the samples were cold centrifuged for five minutes (3000 turm per min.) . The supernatant was aspirated and stored until analyzed.

Total cholesterol concentration in saliva was measured by enzyme colorimetric testing (Biomerieux Kit, France) and glucose concentration was measured by glucose oxidase method using Randox kit, for urea concentration it was measured by Berthelot modified method (Biomaghreb Kit, Tunisia) and uric acid concentration was measured by enzymatic method(Girona Kit, Spain).

Results are expressed as mean± SD. Data were analyzed by using t-test. A P- value less than 0.01 was considered statistically significant.

Results

The measurement of the mean concentration of total cholesterol in the saliva of post menopausal group was significantly higher (P< 0.01) from premenopausal group as shown in figure (1) and table (1). For the mean concentration of urea level it was again significantly higher in the saliva of postmenopausal group than premenopausal (P < 0.01) as shown in figure (2) and table (1)

Table (1):- The concentration of total cholesterol, glucose, uric acid and urea in the saliva of the two groups (mean ± SD)

|	PRE-MENOPAUSE	POST MENOPAUSE	P<0.01
Cholesterol mg/dL	7.82± 3.13	10.6± 2.83	**S**
Glucose mg/dL	6.11± 2.25	5.59± 2.11	**NS**
Urea mg/dL	3.88±0.59	8.61± 0.85	**S**
Uric acid mg/dL	1.37±0.195	1.31± 0.15	**NS**
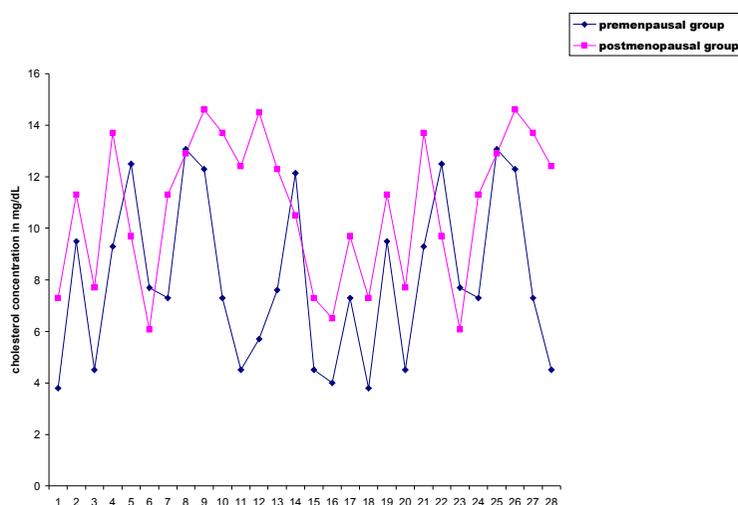
Figure(1): The mean concentration of total cholesterol in the saliva of the two groups significantly higher in the postmenopausal groups(P<0.01) .
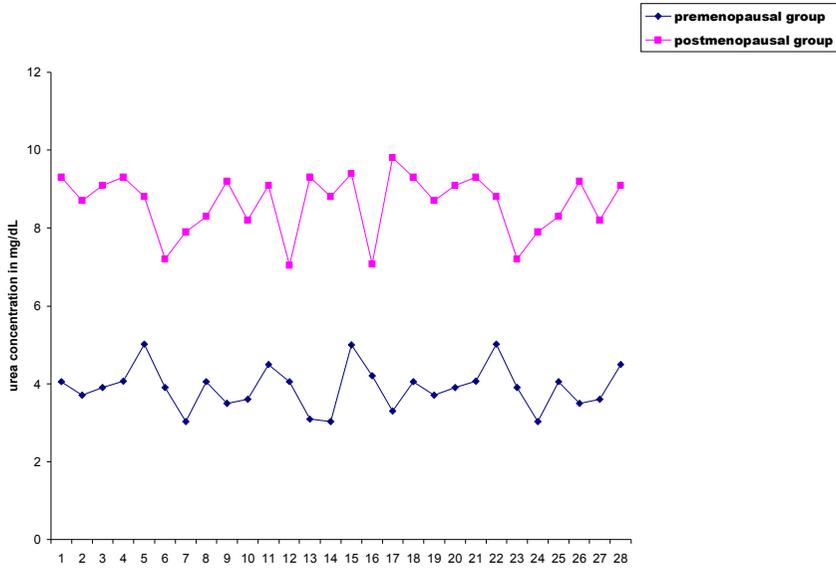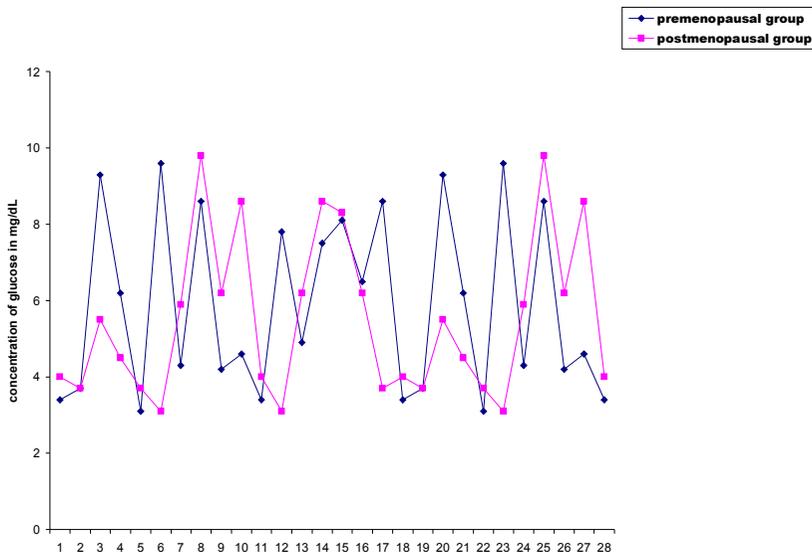
Figure (2) : The mean concentration of urea in the saliva of the two groups significantly higher in the postmenopausal group(P< 0.01).

For uric acid and glucose there were no significant difference between the two groups as shown in table (1) and figure (3) and (4).
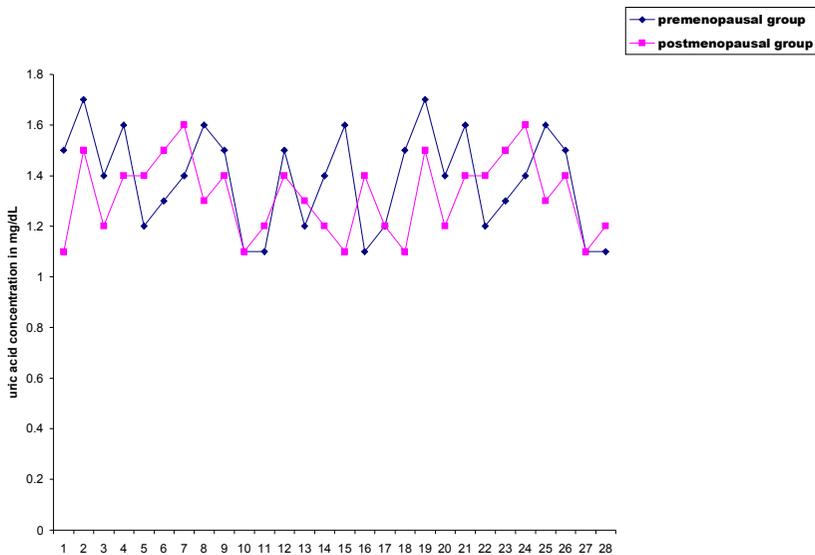
Figure (3): The mean concentration of uric acid in the saliva of two groups no significant difference (P>0.01)

Figure (4):The mean concentration of glucose in the saliva of the two groups no significant difference (P>0.01).

Discussion

The effect of age on various metabolic pathways has been studied in many researches [7, 8, 9]. Some of these studies included saliva as one of the body fluid that could change in composition due to hormonal changes that happen after menopause [10, 11].

Some researches suggest a relation between saliva flow rate and saliva composition, so any factor that affect the flow rate will affect the composition and one of these factors is the age [12]. It seems that old age can cause diminished salivary flow rate [13], but not all studies agree with this some of them suggest no relation [14]. The relative concentrations of the organic and inorganic salivary constituents are known to depend on salivary flow rate[15], in this study the concentration of some of the biochemical markers were measured in the saliva of females which are in the premenopausal age and those which are post menopause to compare between the two groups.

In case of urea some studies confirm that in a healthy adult patient's salivary urea level were significantly lower than in elderly subjects [16]. In this study the concentration of urea were significantly higher (P<0.01)in postmenopausal females than pre menopause. Some

studies suggest that salivary urea levels reflect the progression of renal dysfunction and may even serve as a diagnostic criterion [17] .

For glucose many researches studies the relation of glucose level in saliva with diabetes mellitus some try to study the difference in the level of glucose between serum and saliva of diabetic patients some studies measures the benefits from using saliva as a sample for diagnosis of diabetic patients other researches suggest a strong relation between glucose in saliva and early diagnosis of stroke and hypertension [18]. In this study we compare the level of glucose between two groups of completely healthy females but with different age (premenopausal and postmenopausal groups) aiming to understand the possible changes in saliva composition of glucose due to hormonal changes, there were no significant difference between the two groups,

In some of the researches the measurement of cholesterol in the saliva and serum of healthy persons suggest no significant difference between the two samples in the same person [19]. In recent researches the measurement of cholesterol in saliva has been used for the diagnosis of systemic disease conditions like stroke and stroke prone patients which confirm it is reliability in the diagnosis [20] . In this study cholesterol was found to be significantly higher (P< 0.01) in postmenopausal females than premenopausal group.

For uric acid some studies uses uric acid as plausible parameters in prediction of ischemic stroke, it is found to be significantly higher in stroke – prone individuals, they also measure the relation between saliva and serum level of uric acid in disease and healthy individual [20]. In this study the measurement of uric acid level in saliva of pre and post menopausal females reveal no significant difference between the two groups.

Conclusion

There are very little data on the contribution and function of salivary glands regarding old age and systemic disease, this study suggest the presence of a relation between age and composition of saliva it change due to changes in metabolic pathway. The results emphasize the need for further study regarding not only age but also the gender and systemic medication into account in all salivary diagnosis.

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