Viewpoint

SALIVA AND PSYCHIATRY

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INTRODUCTION

Saliva, a fluid in our mouth, is produced by parotid, submandibular and sublingual glands along with around 450-750 minor glands. Salivary fluid is an exocrine secretion and has one of the most difficult roles to perform in the body. It has complex composition and versatile physical properties. The protein and ion components make a solution that is 99% water into a viscoelastic solution capable of many roles, such as acting as a lubricant and antimicrobial agent, preventing the dissolution of teeth, aiding digestion, and facilitating taste.[1]

A healthy individual's mean saliva production is around 1-1.5 litres per day. Salivary secretions vary by various sensory stimuli and emotional changes.[2] The quantitative study of saliva is called sialometry. Sialochemistry involves the analysis of salivary composition, both organic and inorganic constituents, by means of different biochemical, electrophoretic and immunological analytical methods.[3] Saliva has received little attention among researchers in psychiatry.

SALIVA AND EMOTIONS

One of the landmark studies related to salivary secretion was conducted by Ivan Petrovich Pavlov on dogs almost a century ago. It led to the classical conditioning principle currently used in behaviour therapy.[4]

Emotional states like anger and anxiety can reduce the saliva secretion.[5] Increased speech in mania can lead to dryness of the mouth. Intense emotions and social interactions can also increase salivary secretions.[6]

SALIVA AND PSYCHIATRIC MEDICATIONS

Many of our drugs influence salivary secretion. Clozapine can cause hypersalivation to such an extent that it sometimes needs to be withdrawn. Risperidone, olanzapine, alprazolam, buspirone, ketamine, lithium, levodopa, and cholinergic agonists are other drugs which increase salivary secretion.

Anticholinergics like trihexyphenidyl, benzhexol and benztropine mesylate, commonly used in psychiatry to prevent drug-induced extrapyramidal symptoms, reduce salivary secretion.[7] Other drugs like atropine and atropine-like antispasmodics (propantheline bromide), tricyclic antidepressants (e.g. amitriptyline), tetracyclic antidepressants (e.g. maprotiline hydrochloride), orphenadrine, antihistamine drugs (H1 blockers), and some phenothiazines which are antihistamines produce dryness of the mouth. Phenothiazine derivatives exhibit weak anticholinergic activity. Glycopyrrolate, nicotine, amphetamines, bupropion, modafinil and beta blockers too reduce salivary secretion. Clonidine, frequently used in the

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treatment of hypertension and attention deficit hyperactivity disorder, produces xerostomia.[7]

A few patients, especially the elderly, report altered taste in the mouth due to psychotropic drugs.[8] Altered taste can at times be a part of the psychotic symptoms.

DROOLING AND SPITTING

Drooling, also known as drivelling, ptyalism, sialorrhea, or slobbering, can be defined as salivary incontinence or the involuntary spillage of saliva over the lower lip. Drooling could be caused either by excessive production of saliva, inability to retain saliva within the mouth, or problems with swallowing. Drooling can lead to functional, cosmetic or clinical consequences to patients and their families and caregivers.[2] Drooling of saliva can be a complaint in persons with intellectual problems, dementia or behavioural disorders due to organic conditions.

Spitting can be seen in people with psychosis, delirium, or tic disorder; in defiant children as an expression of anger; and as a compulsion in obsessive compulsive disorder.[9]

SALIVA AND EATING DISORDERS

Bulimia nervosa is associated with repeated, induced vomiting which can cause discolouration of the teeth as the saliva gets mixed with the acidic gastric contents.[10]

SALIVA IN DIAGNOSTICS AND THERAPEUTICS

There are studies on lithium testing in salivary samples.[11-13] Despite a positive correlation between saliva and serum lithium levels, attempt to predict the serum lithium level by salivary lithium estimation did not have much success.[12]

Vlaar et al. claim a high and stable relation between saliva and serum lithium concentration. However, they consider the salivary lithium level less reliable as a predictor of the serum lithium level in patients who are treated with the commonly used 'lithium carbonate' preparation of lithium.[13]

Therapeutic drug monitoring (TDM) of several drugs is generally done by blood testing. TDM of the drug carbamazepine can be done by salivary testing which is simple and painless. Salivary drug levels of carbamazepine closely reflect the free drug concentration in the blood.[14]

Recently, Abdolmaleky et al. did a study on salivary samples to find out markers for individual psychiatric disorders.[15] Salivary sample testing to predict drug response and possible side effects is underway.[16]

Andersen et al. showed that exposure to substance use is associated with significant changes in DNA methylation signatures of peripheral blood cells, suggesting the possibility that methylation assessments of blood or saliva could find broad clinical applications in substance use disorders.[17]

The advantages of collecting saliva over blood: The primary advantage of saliva is that it can be collected non-invasively, making it easier to collect samples (except in acutely disturbed and noncooperative patients).[18] Saliva collection is painless, convenient and cost effective; and it is easier to obtain consent from families who may worry about blood draws. Saliva samples can be stored and transported easily compared to blood samples, and the chance of technicians encountering infections via the collected saliva samples is low. Salivary fluid testing was found to be generally preferred by patients and staff. Although there was an additional financial cost involved in its testing, it was outweighed by the significant benefits of preservation of patient dignity and staff time savings.[19]

However, although simpler to collect, composition of saliva is more variable than that of blood or urine. Flow and composition of saliva are influenced by age, gender, individual hydration, body posture, lighting, smoking, circadian rhythms and medications.[18] Its composition is also affected by the proportions of secretions from the different glands as well as a mixture of food debris, bacteria and shed

cells. Saliva collection is subject to inconsistencies due to gustatory stimulation throughout the collection procedure.[18]

The role of saliva in routine psychiatric practice is hardly noticed. Though saliva must wait for the technology to catch up to tap its full potential, psychiatrists should pay more attention to this important body fluid involved in presenting complaints, psychopathology, diagnostics, and therapeutics.

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