



Drug Excretion in Saliva - A Review

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ABSTRACT

The components of saliva act as a indicator of body's health condition. Saliva contains biomarkers obtained from serum, gingival crevicular fluid and mucosal transudate. As a diagnostic tool Saliva helps individuals, researchers and health care professionals. Since using saliva is non-invasive, inexpensive, safe, less time consuming it can also be used in mass health programs. It helps in not only detecting various diseases but also to find the excretion of various drugs since one of the functions of salivary gland is excretion of drugs. This review article gives details about salivary excretion of drugs.

Keywords: Drugs, Excretion, Diagnosis, Saliva.

INTRODUCTION

Saliva is secreted mainly by 3 major glands like parotid, submandibular and sublingual and many other minor salivary glands, which provides the main functions like lubrication and helps in taste, speech and digestion. The secretions from these glands is mixed with nasal, bronchial, secretions, gingival crevicular fluid, blood constituents from bleeding gums, bacteria, virus, fungi, exfoliated epithelial cells and the food debris^{1, 2}. These contents help in diagnosing various diseases. Saliva also plays a major role in excretion of drugs hence it can also be used to find the excretion of drugs by using drug monitoring system³.

EXCRETION OF DRUGS

Salivary excretion is not really a method of drug excretion as the drug will usually be swallowed and reabsorbed, thus it is a form of 'salivary recycling'. Drug excretion into saliva is dependent on pH partition and protein binding. In most of the cases salivary concentration represents the free drug concentration in plasma. This mechanism plays a main role in terms of drug monitoring, which determines drug concentration to assist in drug dosage adjustment.^{4, 5}

The action of drugs generally ends with their metabolism and/or elimination in urine or to a lesser extent in bile, expired air or directly through the intestinal wall. A minor role is played by sweat, tears, breast milk and saliva⁶. Saliva is not truly an excretory route however as it is usually swallowed, thus allowing some drugs to be reabsorbed from the gastrointestinal tract.

Gingival fluid is different from glandular saliva particularly regarding albumin, globulin and fibrinogen concentrations which are similar to those in plasma.⁷

The pH of saliva varies from 5.8 to 8.4. Unionized fat soluble drugs are excreted passively from saliva. The bitter after taste in the mouth of a patient is main

indication of drug excreted. Few basic drugs inhibit saliva secretion and are responsible for mouth dryness. Compounds usually excreted in saliva are Caffeine, Phenytoin, and Theophylline.

The salivary elimination of various compounds, like mercury derivatives, has been known for a long era and it is admitted that the salivary concentration of liposoluble drugs is the reflection of their plasma concentration in free form. But compounds such as iodide and spiramycin, are higher in saliva than in plasma.

There are a variety of methods for collecting the components of mixed saliva⁸, but in most studies on salivary drug concentrations share only to mixed saliva. Low concentrations of sulphapyridine were detected in the saliva of people under oral or intramuscular treatment⁹, following a combined intra muscular injection of benzyl penicillin and streptomycin and after single intra venous injections of chloramphenicol or chlortetracycline, only low levels of both of these drugs were detected in saliva¹⁰. There were no correlations between serum and saliva levels of these drugs. Phenoxymethylpenicillin, ampicillin, cloxacillin, cephalixin, erythromycin stearate, sodium fusidate, tetracycline hydrochloride, pristinamycin and lincomycin hydrochloride could not be detected in mixed or parotid saliva of normal individuals after a single oral dose. Antibacterial activity was rarely detected in these secretions with spiramycin and erythromycin estolate. Sulphadimidine, clindamycin and rifampicin were frequently present in mixed and parotid saliva¹¹. Antibiotics were detected to a variable degree in gingival fluid even when none was found in mixed saliva and its other components¹². Sulphonamides and antibiotics which are active against the specious N. meningitidis are likely to be of value as chemoprophylactic agents against meningococcal disease if they can be detected in mixed Saliva¹³.

Mixed saliva samples are easy to acquire and might be useful alternatives to blood samples in bioavailability



studies or drug monitoring for individual patients. Antipyrine metabolism was assessed in West African villagers, despite adverse study conditions, by obtaining saliva instead of blood samples¹⁴. amount of drug concentrations, in mixed saliva can be inaccurate however as it is a fluid of variable content. The state of oral hygiene, presence of phenytoin-induced gum hypertrophy and absence of teeth (thus absence of gingival fluid) are factors which might influence salivary drug concentrations and deserve further investigation.

Parotid saliva is more difficult to obtain but gives a more accurate estimation of drug secretion than mixed saliva. In an investigation of industrial workforce for absorption of mercury, mixed saliva samples were unsatisfactory but there was a good correlation between blood and parotid saliva concentrations of mercury¹⁵.

CONCLUSION

The major advantages of using saliva is non-invasive, inexpensive, safe, less time consuming it can also be used in mass health programs. It has been used as a diagnostic medium for several years.^{16, 17, 18} It helps in not only detecting various diseases but also to find the excretion of various drugs. The use of oral fluid has been found to offer significant role, in detection of the use of drugs is sought in a non-invasive manner¹⁹. By using drug monitoring system, the drug excretion through saliva can be easily identified, and drug abuse can also be detected²⁰.

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