LOCAL ANESTHETIC ACTIVITY OF SOME ANIMAL BILE SECRECTIONS

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Summary

PITTA' (Bile) of a large number of animals, belonging to the classes Pisces, Reptilia, Aves and Mammalia are used in Unani medicine. Bile contains salts and pigments. It is generally used in eye diseases, toxic conditions and fevers In this work we studied the local anaesthetic activity of the bile obtained from OX, Cow and Sheep.. We compared its activity to the standard drug Lignocaine. The local anesthetic activity of bile, in comparison with lignocaine, is more intense and of longer duration but the onset of anaesthesia is slower. Ox, cow, goat and sheep bile *Per se* elicited local anesthetic activity, indicates the presence of membrane stabilizing principles in above bile secretions. Local anesthetic activity of ox, cow, goat and sheep bile observed in these experiments can be explored for the treatment of piles. Bile of ox, cow, sheep and goat had greater local anesthetic property than 2% Lignocaine

Key Words: Local anesthetic activity, Animal bile secretions, Frog.

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Introduction

Great success has followed search for drugs in plants and even today large sums of money spent in isolating and examining new substances from the flora of every country, but worthwile discoveries are few and far between. The study of pharmacologically active substances in the animal kingdom is comparatively unexplored and well be very rewarding. The discovery of cardiac stimulant EPTATRETIN in the hag fish and occurrence of powerful smooth muscle stimulant in the cockroach gut are pointers that Invertebrate and Agnathans, as well as the Vertebrata, may have much to interest the pharmacologist. It is the time we paid more attention to the animal kingdom and made a few more preliminary sorties into this almost unexplored territory[1].Animals utilized for medicinal purpose in Unani medicine are so varied that almost all major macroscopic phyla are covered. Entire organisms or their flesh, fat, organs, blood, milk, secretions, excretions, bones, teeth, hooves, horns, feathers, hairs, nails, shells, castings, and even the pathological products formed in the body are made use of in the preparation of the medicine. 'PITTA' (Bile) of a large number of animals, belonging to the classes Pisces, Reptilia, Aves and Mammalia are used in Unani medicine. Bile contains salts and pigments. It is generally used in eye diseases, toxic conditions and fevers. Medicinal properties and therapeutic uses of bile of different animals are BABAR SHER (Lion): it is useful in high fever and cerebritis[2]. BAIL (Ox): Bile is laxative, tonic and stomachic [2].BAKRA (Goat): Bile is good for night blindness [3]. Bile is essential for the digestion of fat. It is secreted by the hepatic cells into the bile capillaries. It is a clear, viscous fluid and is stored in the gall bladder between the periods of digestion, bile is diverted via the cystic duct into the gall bladder where it is concentrated and stored. The gall bladder has a capacity of 60 ml in adult human subjects. It secretes mucin which gives bladder bile its viscid ropy character. Gall bladder concentrates and alters the composition of bile. Its mucosa rapidly removes water and electrolytes but not bile salts. Bile pigmets and cholesterol in bladder bile is about 6 times that in hepatic bile, while the concentration of inorganic salts and specific gravity are nearly the same in both [4].

Bile consists of inorganic and organic compounds. In inorganic compounds the main constituents are bile acids, bile pigments, lipids, fatty acids, cholesterol and mucin. About twelve natural bile acids have been characterized. Out of these the most abundant bile acids in human bile are cholic acid (25 to 60% of total bile acids), deoxycholic acid (5 to 25%) and cherrodeoxy cholic acid (30 to 50%) which differ from one another in the position and number of hydroxyl groups[5].Bile acids are synthesized from cholesterol exclusively in the liver and represents one of the major products of cholesterol metabolism. Bile acids are present in the bile and intestinal content in millimolar concentrations in the physical form of mixed micelles; obviously micelle formation is related to physicochemical properties, and there is a large body of fundamental knowledge about the physico chemical properties of detergents and other types of amphipathic molecules [6].

Methods

Materials : Bipolar electrodes (copper and silver) cleaned thoroughly by scraping the electrodes with a sharp blade for proper conduction of the current, samples ox, cow, sheep and goat bile *Per se* and 2% xylocaine standard were used.

Method: [7]

1. Surface aesthesia: Stunned and pithed a big size frog and layed it on its back in wax tray. Removed the skin over the limbs. Maintained the skin in moist condition throughout the experiment. Two circles (2-3 diameters) were marked on both right and left hind limbs by using marker pen. Stimulated the marked sites with 6-8 mv current using a bipolar electrode to ensure proper conduction Cotton discs of 2-3 mm diameter were moistened with normal saline and pressed between 2 fingers and placed on the circles. Added a known amount of xylocaine on the cotton disc. After every min removed the cotton disc and stimulate. Placed back the cotton disc and repeated the same procedure after every min, simultaneously stimulating the circle at which xylocaine was not administered. This procedure was followed for test bile samples. Noted the time of loss of response. If a frog is big up to 2 spots, can be tested on the thigh and one each on right and left limbs.

2. Infiltration anesthesia: This was tested on the abdomen. The principle and the procedure is same as explained above except that the local anesthetic solution and the normal saline (blank) are administered into the muscle taking care to see that the bulged portion of the injection does not cross the boundary of the marking and that there is no leaking from the hole through which the bile samples and xylocaine were injected.

3. Nerve block anesthesia: Same frog was used far this purpose. Removed the Rectus abdominus muscle completely, and removed the contents below without disturbing the spinal nerves beneath. Keep the nerves moist by adding regularly the frog Ringer solution. Keep the nerves moist by adding regularly the frog Ringer solution. Capillary tubes were placed beneath the nerves taking care to see that the nerves are not injured. Stimulated the nerves as stated above using bipolar electrodes to ensure proper activity. Kept two discs on the right and left nerve plexus processed as stated before. Added a known amount of xylocaine on one of the cotton discs and normal saline on the other. This procedure was followed by bile samples. After every min removed the disc and stimulated at the same spots. Note the time when the nerve on which the disc containing xylocaine fails to respond.

Results

Local anesthetic activity of ox, cow, goat and sheep bile on frog (heated at 97^{o}c for 30 min) showed that ox, cow, goat and sheep bile *Per se* elicited local anesthetic activity

Table 1
Local anesthetic activity of ox, cow, goat and sheep bile on frog.

Sample		**onset time(min)**
2%Lignocaine (surface)	0.1 ml	65.6 ± 5.2
2%Lignocaine(Infiltration)	0.1 ml	6.2 ± 0.68
2%Lignocaine (NerveBlock)	0.1 ml	12.5 ± 2.82
Ox bile *Per se* (surface)	0.1 ml	60.8 ± 2.94
Ox bile *Per se* (Infiltration)	0.1 ml	4.1 ± 0.91
Ox bile *Per se* (NerveBlock)	0.1 ml	7.8 ± 0.93
Cow bile *Per se* (surface)	0.1 ml	60.42 ± 3.01
Cow bile *Per se* (Infiltration)	0.1 ml	7.4 ± 1.12
Cow bile *Per se* (NerveBlock)	0.1 ml	8.9 ± 0.98
Goat bile *Per se* (surface)	0.1 ml	49 ± 5.2
Goat bile *Per se* (Infiltration)	0.1 ml	4.8 ± 1.63
Goat bile *Per se* (Nerve Block)	0.1 ml	7.9± 1.48
Sheep bile *Per se* (surface)	0.1 ml	40.6 ± 6.29
Sheep bile *Per se* (Infiltration)	0.1 ml	2.8 ± 0.98
Sheep bile *Per se* (NerveBlock)	0.1 ml	11± 0.79

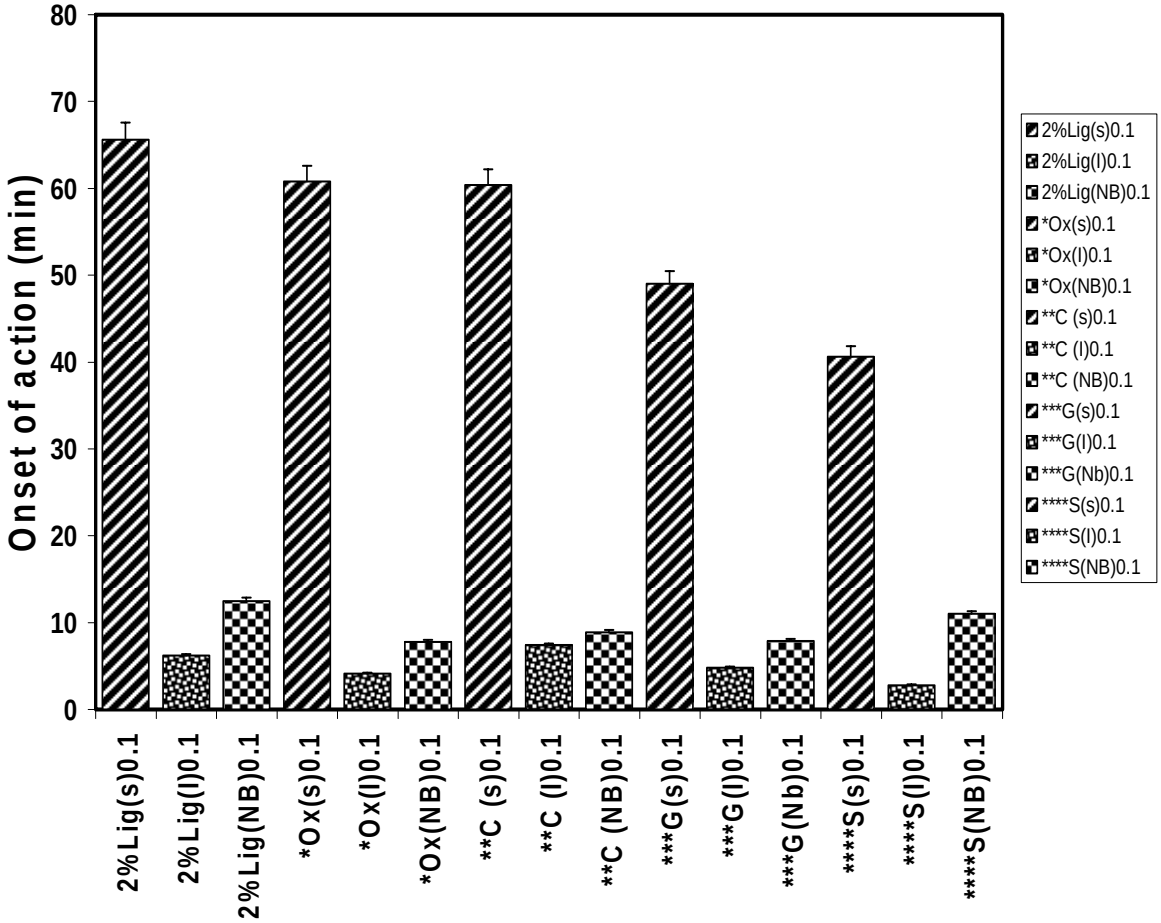

Figure 1. Local anesthetic activity of ox, cow, goat and sheep bile

Data values are expressed as mean ± SD (n=6).

Discussion

Excreta of many animals mostly used externally for the treatments of skin diseases eg. hyper pigmentation, freckles, leucoderma, lentigo, moles pock marks etc. and in the form of 'SURMA' for eye diseases. Other modes of administration are oral ingestion, intravaginal pessary inhalation of fumes etc. intended for a variety of therapeutic effects. *Swallow* excreta used for external application for skin diseases. Ox excreta is styptic, and healing for burns and wounds. Goat excreta a useful application for dropsy and inflammations. Fumes are insecticidal. Duck excreta external application is useful in freckles and scrofula.

Local anesthetic activity tested by Prabhakar (1984) on animals by topical, infiltration and nerve block using ox, cow, sheep and goat bile provided consistent results in all sites tested. Activity persisted after heating at 97^0C showing that the activity is heat stable.

The activity of ox, bile and cow bile were almost and nearly comparable with that lignocaine. Bile of goat and sheep bile activities were much less. Maximum activity was exhibited by ox and cow bile and minimum by sheep bile. Local anesthetic activity of cow bile was nearly same in both infiltration and nerve block. Heating of bile did not influence the site of administration of the bile. The probable mechanism of local anesthetic activity of bile secretions is through membrane stabilization. In Unani system of medicine bile of almost every species of animal has been used as sex promoters, especially of bear bile. In their system the bile is applied on to the penis and gently rubbed to make it insensitive so that the duration of sex is prolonged (Vohra and Khan, 1978).Ox, cow, goat and sheep bile *Per se* elicited local anesthetic activity, indicates the presence of local anesthetic membrane stabilizing principles in above biles. Local anesthetic activity of ox, cow, goat and sheep bile observed in these experiments can be explored for the treatment of piles. Bile of ox, cow, sheep and goat had greater local anesthetic property than 2%Lignocaine.

In conclusion, the present study clearly indicates that herbivorous animals investigated in this laboratory depend mainly on grass and leafy food, secrete enormous bile and bile salts in to the gastrointestinal tract into fecal matter. Local anesthetic property of bile secretions was observed in the present study can be exploited for the development of pharmacological agents.

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