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TECHNIQUES FOR EXTRACTION OF FOREIGN BODIES FROM WAR WOUNDS IN MEDIEVAL INDIA

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INTRODUCTION

History of Medieval India consists of history of Delhi Sultans and Mughals. During this period many Indian medical books were procured and translated into Arabic and Persian, i.e. (1) *Firdaus-ul-Hikmat* (Arabic), (2) *Mejmua-e-Zia* (Persian), (3) *Madan-ul-Shifa Sikander Shahi* (Arabic), (4) *Tibbe-Shifa Mahmud Shahi* (Persian), (5) *Tibbe-e-Dara Shukohi* (Persian). These books were mainly based on *Caraka Saṃhitā*, *Suśruta Saṃhitā*, *Nidāna* and *Aṣṭāṅga Hṛdaya*. A standard surgical book "*Jarahiyat-e-Zehrawi*" was composed by Abul Kasim Zehrawi in Arabic. Standard techniques for extraction of foreign bodies from war wounds in vogue in Medieval India are available in these.

History reveals that with each successive war of any magnitude the problems of military care become more complex because of the increasing number of people involved, the increasing variety and lethality of weapons used and the counter measures used against them. So was the 1st war of Panipat in April 1526, where Babar fought with 12,000 chief fighting force against Ibrahim Lodhi, the Sultan of Delhi, who was supported by 1 lac force and 1000 elephants, out of which 15,000 were killed in action. So one can imagine the number of injured.

Military surgery may be defined as the care of personnel of armed forces in time of war and has to do largely with a group of comparable individuals, for the most part young healthy males who are recipients of wounds and trauma produced by similar weapons, objects and vehicles. So a military surgeon should be cognizant of the common causative agents and the nature of wounds they produce and so the foreign bodies.

Causative Agents

The causative agents of wounds and foreign bodies may be classified as:—

(1) Weapons—Arrows, lances, spears and swords.

(2) Secondary Missiles—Masonry, armor and dirt etc.

(3) Crashes.

The materials used for these were metal, bamboo, tree parts, straw. and horns.

As archery had developed as the most effective way of fighting, arrows were the most frequently used weapons and also a source of foreign bodies due to its deep penetrating effect. The arrows used were of different kinds, i.e. (1) three faceted, (2) flat feathered, (3) flat unfeathered, (4) pointed feathered, (5) U-shaped feathered, (6) round headed and (7) triangular with base of the triangle as sharp cutting edge and others. The sharp part of the arrow was mounted on bamboo shafts and tied with thread or leather strips or the whole arrow was made of metal. Wounding effect of an arrow would depend upon

(1) the amount of energy it transmits to the tissues,

(2) the velocity of the transmission,

(3) the direction of transmitted energy,

(4) the density of the tissues.

And wounds so produced have been classified as (*a*) excised wound, (*b*) deep punctured wound, (*c*) superficially punctured wound, (*d*) incised wound, (*e*) crushed wound and (*f*) lacerated wound.

These wounds could contain foreign bodies which were diagnosed and then extracted.

Methods of Diagnosis of Foreign Bodies

Foreign bodies can get embedded in any one or more of the 8 seats, i.e. skin, flesh, veins, ligaments, bone, joints, viscera and vital points, which could be visible or invisible. Visible foreign bodies could be immediately spotted and extracted out. Diagnosis of presence of invisible foreign bodies was done by (1) history, (2) physical examination and (3) by special methods.

(1) *History.* Information about the kind of weapon used to produce certain injury could be gathered. If pain and swelling arise on such physical acts as riding on an elephant or on horse back, climbing a steep hill or tree, bending of a bow, fast walking, running, wrestling, leaping, swimming, high jumping, yawning, coughing, singing, expectorating, eructating, laughing, practising of *Prāṇayāma* or emission of semen, urine or flatus or defecation, would indicate the location of the embedded foreign body.

(2) ***Physical Examination.*** The important fact to keep in mind is the directions in which a foreign body can peneterate into various seats of the body. In

relation to the site of entrance it could be, superiorly, inferiorly, lateral or medialy, anterior or posteriorly, and oblique.

Local signs of inflammation may indicate the presence of foreign bodies.

(3) *Special Methods.* These are of special interest as they were employed to diagnose the presence of invisible foreign bodies in different seats.

(A) *Skin*—After lubricating with oil and then fomenting it, if application of a plaster of clay, *māśa* pulse, *yava*, *godhūma* and cowdung produces pain, redness or swelling, then presence of foreign body should be confirmed.

Another test is to apply paste of butter, common clay and sandal. The exact location of embedded foreign body would be at a spot where the paste is found to have melted first or dired up.

(B) *Flesh*—The patient should be depleted by lubrication and fomentation, which shall result in dislodgement of foreign body and so could be located at a spot where it gives rise to pain and swelling.

(C) *Viscera, bone, joints, and muscles*—Same as in (B).

(D) *Vein, artery, srotas and ligaments*—The patient should be made to ride in a carriage with broken wheel and dragged on an undulating and rough road. The spot where pain and swelling is complained of by such a procedure, is the seat of foreign body.

Techniques for Extraction of Foreign Bodies

The foreign bodies may be extracted out either (1) from the site of entrance or (2) from the other side if it has penetrated deep into the tissues.

(*a*) *Visible foreign bodies*—If it is visible and can be held by hand, should be extracted out by holding and pulling.

If it is visible and can not be held by hand it should be extracted out with the help of following instruments.

(1) *Simha mukha,*
(2) *Ahi mukha,*
(3) *Makara mukha,*
(4) *Karkaṭa mukha.*

If the foreign bodies are invisible then following instruments have been advised.

(1) *Kaṅka mukha*
(2) *Bhṛṅga mukha*
(3) *Śava mukha*
(4) *Śarāri mukha*
(5) *Vyāsa mukha.*

Hakim Abul Kasim Zehrawi has mentioned of an instrument by the name of *Kalaleb*, the operating end of which resembles the beak of a bird.

Skin—If the foreign body is only skin deep, it should be extracted by forceps.

But if it is deep seated and the point of entry is smaller than the foreign body as in the case of a feathered arrow, then the wound should be enlarged by an incision and the foreign body extracted out by a proper instrument.

Vein and tendon—If the foreign body is lying close to a vein or tendon, it should first be carefully displaced by the help of a probe and then extracted out.

Heart—If it is lying close to heart or has entered the heart, reassure the patient and sprinkle cold water on his face and then the foreign body be extracted out. Abul Kasim Zehrawi has suggested that it should not be extracted.

Bone—If the arrow has penetrated into the bone then the surgeon should extract it with the help of a proper instrument while pressing the injured under his foot. If it does not prove successful then the injured be held by strong assistants and the foreign body extracted out.

Another technique was that the visible part of the foreign body be bent down and tied to the string of a bow, strung and fully bent down and then the foreign body should be ejected out with the means of a full twang.

As an alternative method, the end of the foreign body may be bent down and tied to the bridle of a horse. The horse itself is harnessed by *pañcāṅgi-bandhan*, which means all the four legs and bridle as the fifth point. Then the horse should be so whipped so that it raises its head, thus pulling out the embedded foreign body.

In the absence of a bow or a horse, a high and tough bough of a tree should be lowered down and then tied to the bent end of the shaft as in the preceding case. Then the bough should be suddenly let loose thus pulling out the foreign body with its rebound force.

A foreign body lodged in a bone and lying protruded in the heaved up local

flesh should be stirred by striking it with a round stone and should be extracted out through the point of entry.

If the shaft is loosely attached to the sharp part then it should be fixed with strong thread and then pulled out.

Throat—If shellac gets stuck into the pharynx, a metal tube should be first inserted into the passage and then a heated metallic rod be passed through it to reach upto the shellac, which thus melted by the heat of the metallic rod would stick to it when condensed by injection of cold water poured through the tube. Then the rod should be withdrawn thus carrying away the sticking shellac at its end.

Buccal Cavity and Nose—Foreign bodies should be held and extracted out by proper instruments. If extraction is not possible it should be pushed forward.

Eyes—Foreign bodies lodged in the eye should be extracted by wiping with silk or hair or by washing with water.

Role of Posture—Zehrawi has advised to keep the patient in the same posture while extracting the foreign body, in which he received it.

Use of Magnet—Use of magnet has been advised in those situations where he wound is wide open and the foreign body is lying straight in its base.

Contraindications for extracting the foreign bodies—Zehrawi has advised not to extract the foreign bodies if they penetrate into brain, heart, liver, lungs, kidneys, intestines, and urinary bladder, because death may ensue.

Vāgbhaṭa has advised that if the foreign bodies are lying in the *viśalyaghana marma* or are invisible and produce no complications, should not be removed.

How to confirm that the foreign body has been removed

Suśruta has described that if the patient does not complain of pain, swelling or any other complication and is mentally happy, nothing is felt on probing the wound and movements of the part like, flexion or extension are free of any difficulty, will indicate that there is no foreign body.

SUMMARY

In medieval India many Indian medical books were translated into Persian and Arabic. Standard books describing extraction of foreign bodies in that time were *Suśruta Saṃhitā*, *Aṣṭāṅga Hṛdaya* and *Jarahiyate Zehrawi*. The paper deals with the different foreign bodies which could be present in war wounds,

their varieties, methods of diagnosis, and techniques of extraction. Of special interest are the techniques in which the material used for war was employed for extraction of foreign bodies, i.e. bow, branch of a tree, horse, stone. Use of magnet, and hot rod has also been mentioned. Contraindications for not extracting the foreign bodies and confirmatory signs for extracted foreign bodies are also included.

BIBLIOGRAPHY

"*Firdaus-ul-Hikmat*" of Ali ibn Sahl Rabban al Tabari (d.c. 855), *Bulletin of the Department of History of Medicine*, Hyderabad **1**, 1, (1963), p. 26.

Mejmua-e-Zia, *Indian Journal of History of Medicine* (Hyderabad) **2**, 2. 81, (1964)

Bulletin of the Department of History of Medicine (Hyderabad) **2**. 4, 27, (1964), 3, 1, 29 (1965)., *History of Arabic and Persian Medical Literature*, Calcutta, 1959. p. 96.

Tibbe Shifa—Mahmud Shahi By Hakim Ali Mohammad bin Ali Ismailia Asavali Aseeli, *Bulletin of the Department of History of Medicine*, (Hyderabad) **2**, 3, 165, (1964)

Tibbe Dara Shukohi, *Bulletin of the Department of History of Medicine*, (Hyderabad) 1. 3. 191 (1963)

Srivastava, A. L. *The Mughal Empire*. 1952, p. 16-20, Delhi.

Suśruta Saṃhitā. *Sūtrasthāna*, Chap. 26 & 27.

Aṣṭāṅga Hṛdaya, *Sūtrasthāna*, Chap. 28.

Zehrawi Abul Kasim, *Jarahiyate Zehrawi*. Translated in Urdu *by* Nisar Ahmad Alwi, Aligarh Muslim University, Nami Press, Lucknow, 1947.