

## KAYI (CAUTERIZATION): A TRIBUTE TO UNANI SCHOLARS

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*SUMMARY: Kayi (cauterization), also known as wasm is part of ilāj-bil-tadbīr described in Unani medicine. Many Unani scholars believe kayi to be the most effective mode of treatment in certain disorders. Despite carrying some risks, the therapy was widely practiced and propagated by a number of Unani scholars, with excellent results. Kayi remains one of the largely unexplored areas in modern times. However, a few recent studies have acknowledged its efficacy in certain disorders, which necessitate further scientific studies on the subject. It is also a remarkable observation that a therapy described hundreds of years ago has proved its efficacy on the most recent parameters in modern times. The credit definitely goes to the Unani surgeons of yesteryears who had the courage to take up a difficult procedure and develop it to perfection*

*Key words: Kayi, cauterization, Abul Qasim Zahrawi*

### INTRODUCTION

The application of hot metals to the human body was looked upon by ancients as a powerful remedy in numerous diseases (1), often resorted to as the last mode of treatment in certain cases (2); while in the present day world it is so totally disused, except in a selected few conditions, that the proposal to employ it as a therapy will excite not merely astonishment but alarm. Nevertheless, it is an important part of medical science not only because of its historical importance, but also because many recent researches have rediscovered its efficacy in many disorders.

Kayi (cauterization) is one of the most interesting modes of treatments described in Unani medicine. It

involves the application of hot metals, oils, or corrosive drugs to burn out parts of skin or diseased tissues. According to most Unani scholars, *kayi* also corrects *fasād-e-mizāj*. Therefore, it is recommended as a therapeutic measure in many diseases like non-healing ulcers, migraine, chronic headache, melancholia, liver abscess, and numerous other disorders in almost all systems of the body. *Kayi* was also attempted for the treatment of diseases like cancers, paralysis, piles, destruction of remnant after excision of warts, etc. The instrument used for this purpose is known as *mikwāh* (cautery).

Many Unani scholars believe *kayi* to be the most effective mode of treatment in certain disorders. Despite carrying some risks, the therapy was widely practiced and propagated by a number of Unani scholars like Ibn Sina (980-1037 AD), Ibn al-Qaf Masihi (1233-1286 AD),

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Ali Ibn Abbas Majusi (930-994 AD), Abu al-Qasim Khalaf Ibn Al-Abbas Al-Zahrawi (936-1013 AD), and many others. However, the credit for developing and establishing *kayi* as a mode of treatment undoubtedly goes to the fearless surgeon Abul Qasim Zahrawi who described it in complete detail including the indications, precautionary measures, and possible risks involved. In addition to this, the surgeon has also provided guidelines regarding the necessary antiseptic measures, which were truly ahead of the times. The distinguishing feature of *Jaraḥiyāt Zahrāwi* is the inclusion of illustrated diagrams of diseased organs, sites of cauterization, and necessary instruments, which truly make the book a masterpiece.

#### A BRIEF HISTORY OF CAUTERIZATION—from ancient to modern age

One of the earliest references to *kayi* is found in the books of Hippocrates (460-377 BC), who advocated the use of *kayi* in various disorders. He advised the use of *kayi* for the treatment of hemorrhoids (3), trachoma (4), etc. Archeological excavations have revealed that cauterization was also employed as a treatment modality in North America in ancient ages, as is evident from a cauterized skull found in California, which was estimated to be of around 300–500 AD (5). The illustrious physician Celsus (first century AD) employed cauterization by hot iron to stop hemorrhage when all other methods had failed. He states:

*“But if even these are powerless against the profuse bleeding, the vessels which are pouring out blood are to be seized, and round the wounded spot they are to be tied in two places and cut across between... When circumstances do not even admit of this, the vessels can be burnt with red-hot irons.”* (6)

The second century physician Jālinūs (131–199 AD) describes in his treatise *On tumors against nature*, the use of cauterization for burning the roots of a tumor, a process that may also prove to be dangerous (7).

The science of cauterization has undergone tremendous changes ever since its inception. It is one of those medical procedures that have been advocated by Prophet Mohammad (SAW) and also practiced by him



Illustration showing the cauterization for treatment of low-back pain from *Cerrahiyetül Haniye*. Adapted from Naderi S. *et al.* History of spinal disorders and *Cerrahiyetül Haniye* (Imperial Surgery). *J Neurosurg (Spine 3)* 2002;96:352-6.

on some occasions. In a Hadith narrated by Al-Tirmidhi, it is stated that Anas (RA) was cauterized by Prophet (SAW) himself when he had sepsis on his finger. On another occasion, the Prophet (SAW) cauterized Sa'd bin Mu'adh on his medial arm vein to stop bleeding. However, the Holy Prophet (SAW) allowed the use of *kayi* only in severe cases; he was not in favor of this procedure as a routine (8).

This inspired the Muslim physicians to further the art and science of *kayi*. Significant academic and clinical researches related to cauterization were performed and documented during the middle ages that contributed greatly in terms of knowledge and also helped to preserve the essential aspects of *kayi* for future reference. Among the earliest Muslim physicians to research on *kayi* was Rabban Tabri (770–850 AD) who mentioned the use of *kayi* in the treatment of sciatica in his famous treatise *Firdaus al-Hikmah* (9). Later, Zakariya Razi (865–925 AD) described the use of cauterization as a therapy in various disorders like sciatica, piles, coxalgia, and even as a means of controlling hemorrhage (10,11,12). Another famous physician-scientist, Abul Hasan Ahmad Bin Mohamed Tabri (d. 985 AD), was also a proponent of *kayi* and described its use in various disorders (13). Ibn Rushd advocated medical cauterization and mentioned some drugs that “act like fire” (14). However, the important thing missing

in the above works was clear and complete guidelines regarding instruments, techniques, and relevant sires for cauterization. This void was filled by the later physicians, especially Abul Qasim Zahrāwi and erefeddin Sabuncuo lu (1385–1468).

The practitioner who truly raised cauterization to its zenith was Zahrāwi. He recommended cauterization with hot metals or hot oils to stop bleeding as well as a part of treatment of many diseases like epilepsy, headache, toothache, depression, and haemorrhoids. An important feature of this treatise is the presence of illustrated diagrams of various cauteries used in *kayi* of various organs. It was the first book that contained such detailed diagrams of more than 50 cauteries. In addition to this, Zahrāwi also included precautionary measures, sterilization techniques, and possible complications of *kayi* along with their remedies in this book (2). This greatly helped in establishing *kayi* as a mode of treatment in various disorders. Later, a Turkish physician, erefeddin Sabuncuo lu improvised the art of cauterization in *Cerrahiyetül Haniye* (Imperial Surgery). The highlight of this treatise are the illustrated diagrams demonstrating the technique of *kayi* in various disorders (15).

The practice later spread to European nations also, who used cauterization as a method of performing blood-less amputations. Cauterization was widely practiced up to the century AD as a method of controlling blood loss and also to reduce the toxic effect of gun-powder in wounds. It, however, diminished from routine use around 1800 AD with the advent of ligatures and tourniquets to control bleeding, and the use of antiseptics in infected wounds. The practice was again revived in the late 19th century AD with the invention of electrical diathermy that produces heat in a more controllable fashion (16) and is in extensive practice to date for stopping bleeding during surgery.

The 19th century surgeon Prof. JP Mounir has described his interesting and successful experiences with cauterization. He used it to successfully treat disease conditions like non-healing sinuses, bite of a mad dog, rheumatism, benign tumors, fungal infections, polyps, etc. He further adds from his experiences that

the patients hardly complained of pain during the procedure. Even if they were vary of it in the beginning, the instant benefits made them return for their next session (1).

However, there are some advocates of cautery in the modern world also. Although cauterization has progressed from hot-metal branding to the more sophisticated electro- and galvanocautery in the recent years, yet the approach to treatment is still the same as described by the ancients.

#### KAYI (CAUTERIZATION)

According to Ibn Sina, the most important benefit of *kayi* is that it halts the spread of sepsis from the diseased organ. Also, it stops the proliferation of infections (17). If *ratūbāt-e-fāsidah* (noxious humors) are accumulated in an organ and are not removed by drugs, then *kayi* proves effective in such cases. According to Majusi, *kayi* is the most effective method of eliminating diseased humors because it causes extreme dryness as compared to any other method (18). Masihi states that *kayi* can also be used to treat sinuses as it helps in closing them by drying up the infected matter present in them. *Kayi* can also be used to check the spread of sepsis from one organ to another. For instance, in the case of catarrh, *kayi* on the head is recommended to stop the flow of humors (19).

Overall, there are five types of conditions where *kayi* may be employed: first, to halt the spread of sepsis; second, to stop the flow of disease-causing humors toward the healthy areas; third, to correct the abnormal cold temperament in an organ; fourth, to stop hemorrhage and fifth to remove dead and necrosed tissues if other methods are not effective. According to Unani scholars, it is the best method to treat dead tissues and stop sepsis from spreading (19).

#### APPLICATION OF CAUTERIZATION AS THERAPY *Balghami* diseases of the brain

Cauterization of the head is usually employed in cases when there is an excess of *balgham* in the brain, which gives rise to catarrh, sleepiness, pain in throat,

paralysis, facial palsy, stupor, etc. Before *kayi*, the patient should be given a suitable *mus'hil* drug for three to four nights, so as to mobilize the noxious matter from the brain.

First, shave the head of the patient and keep him sitting cross-legged with hands kept on the chest. Then, to pin-point the exact site of *kayi*, keep your wrist over the root of his nose and flatten your hand over it. The point where your middle finger ends is the point where *kayi* is to be done. Mark this spot with suitable ink. Then heat the rod which is to be used. Zahrawi has recommended the *Mikwāh zaytūniyah* (Olivary cautery) made of iron for this *kayi* (2). According to Majusi, this rod is shaped like the seed of fruit of olive (18). Then apply this heated rod over the marked spot and press it till a pea-sized area of the skull bone is visible. The operator should not remove his hand from the patient's head during the procedure. After completing, the wound should be covered with cotton dipped in saline water for three days, after that, continue dressing with wet cotton that has been heated under the sun, till the scab clears (2).

According to Ibn Sina, the operator should take care that excess heat may not be applied on the head as it may damage the brain. The heat applied should be just enough so that the skull becomes visible (17). Some physicians suggest that this wound on head should not be allowed to heal for a certain length of time, so that maximum amount of noxious matter may be expelled. However, Zahrawi recommends that this practice often has unpleasant consequences, so the wound should better be treated at the earliest (2).

A recent study published in *Therapy* was conducted after drawing guidelines from *Al-Tasrīf*. It studied the effects of surgical cauterization of selected vessels in extracranial arterial chronic migraine. They cauterized the frontal branch of the left superficial temporal artery, left occipital artery, left posterior auricular artery, left superficial temporal artery, frontal branch of the right superficial temporal artery, right occipital artery, right posterior auricular artery, and right superficial temporal artery according to the sites involved in headache. Such surgery had excellent results in the

quality of life of these patients who were otherwise severely compromised (20).

#### Melancholia

Ibn Zuhr (1092–1162 AD) has recommended that *kayi* is also useful for psychoses caused by melancholia (21). A recent study explored the therapeutic effects of an orbital leucothermy operation using the Grantham technique and placing an electrolytic lesion in the ventromedial quadrants of the frontal lobes of 100 patients with persistent depressive psychoses. It was concluded that the Grantham electrocoagulative procedure is capable of producing maximal therapeutic results with minimal adverse physical or personality defects. It was found to be particularly suitable for the old and debilitated patients (22).

*Şuda'Balghami* (Headache caused due to phlegmatic matter)

According to Hakeem Azam Khan (1211–1320 AD), if such headache is not cured by any means, then cauterization in the middle of the head may be used as the last resort, and it is mostly very effective (23).

#### Epilepsy

Cauterization is said to be effective in epilepsy caused due to *balgham*. Before attempting cauterization, expel the noxious *balgham* from the brain by means of purgatives. If the patient is a young child, give these drugs in the form of gargles or orally for several days before the procedure. Then shave the head of the patient and apply *mikwāh zaytūniyah* on the middle of the head as described earlier. In addition to this, cauterize at one point on the occiput, one on each frontal eminences, and if the patient can bear it, then also on cervical and dorsal vertebra as described under paralysis. If the patient is a child, use a fine cautery (2).

Hakeem Azam Khan has mentioned in *Al-Ikseeer* that during an attack of epilepsy, heat a piece of marjān till it is red hot and cauterize on the forehead between the eyebrows. This relieves the attack and also prevents recurrences (23).

### Otalgia

For otalgia caused due to cold, Zahrawi recommends cauterization with the instrument "punctate." He recommended cauterization on about 10–12 points around the affected ear(s), a little away from the ear, and then dress the wound till it heals (2).

### Facial palsy

For correction of facial palsy, Zahrawi has recommended cauterization at three places: one, at the root of the ear; second, a little below the temple; and third, at the junction of the lips. All the cauteries should be applied on the healthy side. The depth of the burn should be about half the thickness of the skin, and then the area may be dressed and allowed to heal (2).

Cauterization behind the ear is also beneficial in facial palsy (23). Mohammad Tabri has mentioned a type of facial palsy wherein salivation persists even after treatment of the condition. In such a case, he recommended cauterization of the vessels behind the ears and one cauterization in the center of the skull. The cauterization should be done at a point where the skin is soft and lax and the wound should be deep enough so that it results in a contracture (13).

### Enteropion

For enteropion, Majusi has recommended to first pluck the lashes of the affected area with tweezers. Then cauterize the hair roots in that area of the lid margin with a fine cautery (18). Whereas according to Zahrawi, cauterization of the lid is also necessary to cure enteropion. For this purpose, first let the lashes grow completely. Then place the patients head in your lap and beginning near the lashes, make a shape of a myrtle leaf over the affected eyelid with suitable ink. Then place cotton-wool dipped in egg white or mucilage of psyllium seeds under the eyelid. Then heat the recommended cautery and burn over the shape marked out slowly with many strokes so that the skin over the area is completely burnt out. After the procedure, if the eyelid is contracted and the lashes rise from the white of the eye, it indicates successful treatment. Leave the wound for three days, after that apply cotton

wool soaked in butter till the scab falls off. Treat the wound with any suitable ointment. The procedure may be repeated if necessary (2).

### Oral fistulae

Dental or other oral abscesses may lead to the formation of fistulae in the oral cavity that are usually resistant to drug treatment. For such cases, it is recommended to cauterize the fistula with a cautery of such size that may easily fit inside it. Heat this cautery and inset it into the lumen of the fistula and place it inside till the patient starts feeling the heat. Then remove the cautery and ask the patient to wash his mouth with warm saline. The procedure may be repeated as many times as necessary (2).

### Ascites

If ascites is not relieved by medicines, then cauterization should be attempted as the last resort. Azam Khan has recommended cauterizing on the following points: first, over the fundus of the stomach; second, over the liver; third, over the spleen; fourth, on the convex part of the stomach; and fifth, just above the umbilicus. If the patient is strong enough, then cauterize at all sites in the same sitting; otherwise, they may be done on separate days (24).

### Pleurisy

For pleurisy caused by cold humors, cauterization is done using *zarāvand* root (birthwort, *Aristolochia longa* root). Take a long and dry root of birthwort, which is as thick as a finger. Dip it in olive oil and heat it. Then cauterize the patient on the following points: first, in the space between the junction of the neck with the clavicle; second, two small cauterizations below the jugular vein; third, two more cauterizations in the fifth intercostal space; fourth, above the stomach; fifth, one at the center of the chest; and fifth, three cauterizations between the shoulders. It is not necessary to cauterize deeply; just a hint on the skin is enough (2).

### Disorders of the spleen

If any disorder of the spleen is not cured with the

use of medicines, then there are three methods of cauterizing it, each of which is appropriate. First is to cauterize at three or four points in the longitudinal axis of the spleen while the patient is supine. The most effective method is to heat the *mikwāt zātus safūdayn* (two-pronged cautery) and lift the patient's skin over the spleen at the point where his elbow touches it; let the direction of the fold be across the patient's body. Then push in the two prongs well-heated so that the skin is pierced from side to side. This can also be done with a three-pronged cautery. Then allow the pus to run from the site and treat the wound properly. This is more effective than any of the treatments (2). Some physicians use a six-pronged cautery for this purpose to cauterize at six points simultaneously. In such cases, side-to-side piercing is not done (18).

#### Dropsy

In a case of dropsy, Zahrawi has recommended to cauterize the upper surface of the feet in the depression between the little and fourth toes. The cautery should be upright; do not let it slant. Then allow the fluid to escape from the site. Cauterize using a beak-shaped cautery. After this, cauterize both the heels at one point each, in longitudinal direction. Then cauterize the popliteal fossa at one point, and both the thighs at two points each. Then leave the wounds unhealed to allow the fluid to escape. After this, treat the wound along the usual lines (2).

#### Backache

Cauterization is employed for backache caused by the accumulation cold and moist humors. Before cauterization, Habb-e-Mintan is recommended for *istafrāgh* in the usual pharmacological dosage. Then encircle the affected area, and cauterize it in three sessions. If the patient is strong enough, then cauterize the part five times in each session. The *kayi* may be done with *mikwāh nufta* or *mikwāh mismāriyah mutawassitah* (*Mismariyah* = nail or boat shaped; *mutawassitah* = medium sized) which is a beak-shaped instrument (2).

#### Coxalgia

Rabban Tabri (770–850 AD) has quoted from

Kutub-e-Hind that if enema, *hammām*, resolvent ointments, and oral drugs fail in relieving coxalgia, then cauterization may be employed. For such cases, first cauterize the nerves leading to the kidneys. Then cauterize on the thighs, on both the knees, at two points longitudinally on the heels, at the ankle, and all the toes four times. If there is a risk of dislocation of the hip-joint, then cauterize on the affected hip at three or four points and keep the wound unhealed with the use of appropriate drugs, so that the pus may escape (10).

#### Sciatica

There are many sites of *kayi* described for the cure of sciatica by various researchers. There are minor differences in cupping sites among different physicians, depending on their personal experiences. It appears that sciatica was a quite common problem in those times and each physician attempted cauterization as per his own experiences. From what the literature suggests, cauterization appears to be a very effective treatment for sciatica. The exact sites and method may preferably be decided after detailed scientific studies.

According to Zakariya Razi, if cupping is not successful in eliminating sciatic pain, then cauterization should be attempted. Do the cupping on the area having pain, longitudinally on both the thighs. Then cauterize on the heel at the lateral surface, below the ankle and also cauterize at one point on the smallest toe. Razi says that this method cures sciatica permanently (10).

The renowned Unani physician Jorjus says that if sciatica relapses, then cauterize on the following sites: one point on the buttocks, second on the thigh posteriorly, and then on the heel. According to Falighrus, the wounds caused by the cautery should be allowed to heal in this disease. Rather, they should be kept fresh with suitable drugs so that the noxious matters may be expelled. Hunain Ibn Is'haq has suggested that if a patient of sciatica is also suffering from plethora, then venesection will be more effective, and after this, cauterize the point where venesection was done. In *Ebiz-imiya*, Hippocrates has mentioned that cauterization on the gluteal region helps in relieving sciatica (10).

Razi has mentioned a detailed description of cauterization for sciatica. He recommends that cauterization should be done on all points from the back to where the pain is felt, but the muscles of heels should be spared. The places on toes where the pain ends should be cauterized deeply. After that, the wounds should not be allowed to heal. The patient should not be allowed to have dinner on the day of cauterization (10). In our personal experience, we have attempted *hijamah bil-shart* on the same sites in several patients, with highly successful results.

#### Hemorrhage

The control of hemorrhage has always been a challenge, especially in surgical cases. Cauterization has been described as a powerful tool against hemorrhages by Unani scholars. According to Jalinoos, if cauterization is done properly, it gives rise to eschar that is devoid of any blood supply. Therefore, it acts as a powerful hemostatic by making the skin thick and stops blood flow to the area. This is the same as fire burns. But at the same time, he is quick to point out that if such severe hemorrhage occurs that requires the use of cautery, then the patient's life is at risk (11). Therefore, it is recommended to employ a very hot cautery for this purpose; otherwise, it may fail in controlling blood flow, rather the heat may even aggravate the hemorrhage (11,12). In *Kitab-al-Adviya Al-Mufradah*, Hippocrates (460–377 BC) has mentioned that if cauterization results in fever in such cases, then it will be most effective in causing haemostasis. In this context, Jalinoos has described pure gold as the best metal, as it does not lead to blister formation (12).

#### Cancers

Ahmad-al Hasan Jurjani has also mentioned his experiences of cauterization in cancers. He says that the affected site may be cauterized after excising the diseased tissue. However, the excision and cauterization may sometimes lead to further deterioration, especially if the tumor is near a vital organ (25).

#### Piles

Razi has quoted from a physician named Ahran

that burnt sesame seeds (*Sesamum indicum*), if applied on the pile mass, give instant relief in the pain caused by piles (10).

#### Syphilis

The treatment of nodules occurring in tertiary syphilis has been described using the following corrosive drugs: *Khardal* (*Brassica nigra*), *Zubd-ul-bahr*, *Sulphur*, *Revand*, *Muqil* (Gum of *Commiphora mukul*), *Ashq* (*Dorema ammoniacum*), and *Roghan-e-mom kuhna*-powder, and mix all drugs in equal quantities and apply extensively over the nodules so that blisters are formed (11)

#### PRECAUTIONS AND CONTRAINDICATIONS

There are certain contraindications to the practice of cauterization as well as some guidelines for the same. For instance, Buqrat has stated in *Kitab Al-Ahwiya wal-Miyah wa-Buldan* that cauterization should not be done in extremes of cold and hot weather. According to Jalinoos, the best metal for cautery is pure gold. It does not lead to blister formation, and the wound heals early (12). However, Zahrawi has stated that although gold is a better metal for cautery, it may sometimes liquefy on heating. Therefore, iron may be preferred for this purpose (2). It has been advised by Ibn al-Qaf Masihi that nerves, ligaments, tendons, and muscles should never be cauterized (19). If cauterization has to be done inside an orifice like uterus, nose, etc, then the cautery should be placed inside a hollow tube while inserting it inside, to protect the healthy tissues (12).

#### CONCLUSION

This review is an attempt to explore the concepts and guidelines regarding *kayi*. It is certainly overwhelming to observe the amount of research that was painstakingly carried out by the Unani surgeons, and the results were certainly encouraging. It is also noteworthy to consider the fact that this largely forgotten therapy carries great promise for the treatment of certain diseases, where even the most modern researches have not been completely successful. It is also notable

that although cauterization was abandoned in the past due to the development of more sophisticated and effective therapies, yet the experience of recent years has definitely proved two things: first, modern therapies

have also failed to treat certain diseases and second, cauterization requires less sophisticated instruments and material. Therefore, it may be proved to be of special benefit in low-resource settings.

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