IJIRR

International Journal of Information Research and Review
Vol. 1, Issue, 10, pp. 121-123, October, 2014

Full Length Review Article

CONTRIBUTION OF AL-ZAHRAWI IN THE FIELD OF ORTHOPAEDICS

[1,*]HafizIqtidar Ahmad [2]Ahmer, S.M., [3]Sartaj Ahmad [4]Ferasat Ali

[123]P.G. Scholar D/O Kulliyat, F/O Unani Medicine, AMU, Aligarh, India
[4]Associate Professor D/O Kulliyat, F/O Unani Medicine, AMU, Aligarh, India

ARTICLE INFO

Article History:
Received 27th July, 2014
Received in revised form
25th August, 2014
Accepted 18th September, 2014
Published online 30th October, 2014

Keywords:
Al Zahrawi,
Al-Tasrif

ABSTRACT

Abu Al-QasimKhalaf*bin* Abbas Al Zahrawi(A.D.936-1013)known to west by his Latin name*ALBUCASIS,* was simply the greatest Muslim surgeon,with European surgeons of his time coming to regard him as agreater authority than even Galen.What is known about Al Zahrawi is contained in his only written work *Al-TasrifLimanAjiza'Min At- Ta'lif* (The Method Of Medicine). *Al-Tasrif*is medical encyclopaedia of 30 volumes compiled from medical data that *AL ZAHRAWI* accumulated in a medical career that spanned five decades of teaching and medical practice.The last and largest volume of *Al- TASRIF* on surgery was nothing less than the greatest achievement of medieval surgery. The variety of operations covered is amazing. In this treatise Al-Zahrawi discussed fas'd (bloodletting),mid-wiferyand obstetrics, the treatment of wounds, the extraction of arrows, and setting of bonesin simple and compound fractures.He wrote extensively about injuries to bones and joints,even he mentioned fractures of nasal bones and of the vertebrae.In fact, Kocher's Method for reducing dislocated shoulder was described in *Al-Tasrif* long before Kocher was born. Al Zahrawi has described nearly 35 diseases regarding bones discussing their principle of management and surgical procedures. The details will be discussed in full length paper.

INTRODUCTION

It is often difficult to procure evidence upon which a definite answer to the numerous facets of progress of human advancement can be based. However, it is in general acceptance that advancement in knowledge is achieved through a process of continuous occurring of data from all available sources at different times. The object of this presentation is to summarize the contributions of AbulQasim al-Zahrawi in the management of fractures. His contributions to medicine in general must not be constrained by a too narrow interpretation of the title of this essay. Most physicians of the time occupied themselves with the science of medicine, of internal medicine as it is known today.

There were also those who even considered the surgical art to be inferior and a separate branch of medicine. And orthopedics was not yet separated from surgery. Hence, it seems pertinent to recapitulate the contributions of AbulQasim, a doyen among the Islamic physicians in fractures; and attempt to evaluate its relevance in the light of contemporary medicinal practice.

Corresponding author: HafizIqtidar Ahmad

P.G. Scholar D/O Kulliyat, F/O Unani Medicine, AMU, Aligarh, India

Albucasis

"Without doubt, the chief of all surgeons" (Pietro Argallata) AbulQasimKhalafIbn al-Abbas al-Zahrawi, known as Albucasis in Latin Europe, was a practicing physician in Cordova at the time of Caliph Abd-ar-Rahman III. He was born in al-Zahra in 936 and died in 1013.

AL-TASRIF

What is known about Al Zahrawi is contained in his only written work *Al-Tasrif Liman Ajiza Min Al- Ta'lif* (The Method of Medicine). *Al-Tasrif*is medical encyclopaedia compendium of 30 volumes compiled from medical data that *Al Zahrawi* accumulated in a medical career that spanned five decades of teaching and medical practice. The last and largest volume of *Al- Tasrif* on surgery was nothing less than the greatest achievement of medieval surgery. The variety of operations covered is amazing. The thirtieth volume of his work on surgerycontained: 3 *bab* (sections) and numerous *fasl* (chapters). It was the first independent surgical treatise everwritten. The famous French surgeon

Guy de Chauliac wrote: (it was nothing less than the greatest achievement of medieval surgery), he quoted *Al-Tasrif* over 200times. A plethora of information is available in this well-

illustrated medico-surgical encyclopedia. The information presented in this article is acquired from this book taken from the chapter on Surgery and Instruments, Book 3 on Bone setting. He has written 35chapters (fasl) describing fractures of different bones of body covering their etiology treatment, and complications. He defined a fracture as a separation or fragmentation of a bone. This may be a clean break without splintering, or along the bone, or with splinters or may involve a wound.

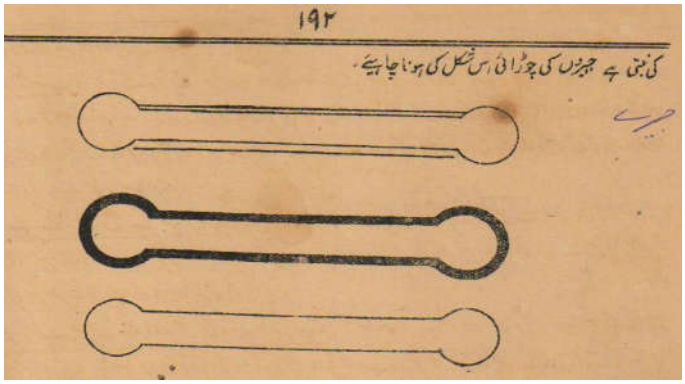
Hence, among its clinical features he included distortion, protrusion and palpable crepitus. In its absence, however, and if pain is not elicited on attempted movement of the affected bone he advised to suspect a crack in the bone, the greenstick fracture in current terminology. He mentioned that there were various types of fractures and well described the two most common clinical types namely the closed and the open fractures. Bone healing, he believed, was due to the production of something like glue around the fracture site, with a certain viscosity which helps it join and binds it so as to ensure a firm linkage. This is perhaps what he alluded to the formation of callus through its stages well before the discovery of the microscope.

His observations that fractures in the mature and the old cannot mend into original condition on account of the dryness and hardness of the bones; though soft bones, like those of infants unite and heal readily is in consonance with the current understanding of osteoporosis in the aged and the exuberant remodelling ability in the young. His remarkable conclusion that cranial and extremity bones healed differently is in concurrence with our understanding of cartilaginous and membranous bone healing. In his recommendations on the managements of fractures he advocated manipulative reduction with external immobilization. If the bones were parted, he said, reduction was to be effected by traction, and counter-traction, using diligent manipulation in order to secure exact reposition of the bones and avoiding violent compression. His classical method of resetting a fractured cocky was by exerting corrective pressure by a finger introduced through the rectum, a practice not un-commonly used today.

In green- stick fractures he practiced immobilization without manipulation. As to the method of immobilization Abul Qasim suggested the use of bandages, plasters or splints (which he called jabeera). Bandages were cut in different sizes to suit the size of the fractured part. It was used as slabs or applied circumferentially exerting gentle and even pressure, often in two or three layers and extending beyond the level of the fracture site. Between the layers of the bandage enough soft tow or rags were inserted to help correct any curves of the fracture and mellow the pressure. The current Robert Jones bandage seems to simulate this very closely.

JABEERA IMAGE

In order to make a plaster, when a stiffening effect was required on the bandage, the recommendation was to treat with mill dust, fine flour and egg albumen. Identical plasters were used in England and in the Napoleonic campaigns. It was to be replaced only by introduction of plaster of Paris in 1877. As an alternative method combination of pulse, gum mastic, acacia, powdered clay with water and egg white was also being used. And, in his management of lower jaw fracture with binding of



teeth using gold or silver wire or silk ligature in conjunction with external gum mastic plaster is a reminder to the modern management with interdentally wiring and the Gunning splint. Splints were made out of broad halves of cane, branches of palm, or pine wood. They were cut and shaped and made of a size that suited the fractured part. In practice, splints were helped by bandages with the greatest pressure over the fracture site and lessened pressure only from it. They were well padded with soft tow or carded wool to alleviate the pressure points. Other than the construction material there appears to be no substantial differences with the splints of today.

Being aware of the potential dangers of splinting a fractured extremity, he cautioned against: -

1. Any loosening of the bandage as it indicated the subsidence of the swelling and the relative inefficacy of the Immobilization.
2. The presence of pain that signified an increase in the swelling of the extremit
3. Appearance of swelling distal to the bandage as it suggested too tight a splintage, and
4. Itching as this was due to skin intolerance to material used.

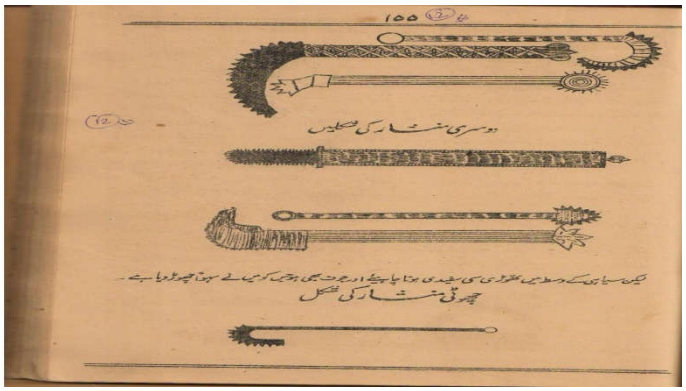
In all such cases he advocated immediate removal of bandage and resting the limb until the signs and symptoms abated. Re-application was done only when the safety of the limb was assured. A remarkable feature in his immobilization technique was to defer it in fresh fractures complicated with gross swelling and adopt the practice of "Delayed Splintage" only when the swelling had disappeared usually after a period of 5-7 days.

In accordance with the contemporary accepted surgical principles, he advocated that immobilization was to be continued until healing had taken place. In his experience, bones of the extremities healed as follows as he described; ‘Scapula in 20 to 25 days, lower jaw in 21, the collar bone in 28 and humerus in 50 to 60 days. In the case of forearm bones, the average time for healing was 30 to 32 days, but in cases with isolated fracture of the ulna the healing tended to be a bit delayed’. Almost 900 years later, Sarmiento-et-al in 1976 concluded "Solitary fracture of the ulna shaft has a reputation of non-union".3 London in 1967 stated "it is uniformly agreed that the ulna, although it is called the stationary bone of the forearm, is most likely to fail to heal following a fracture. Even an 'innocent looking' crack across the bone may end in non-union". These reflect the brilliance of the observations of AbulQasim. In the lower extremity, the femur took 50, the leg bones 30 and the pelvis 7 days to heal. He further clarified that such healing

was influenced by the general constitution of the patient and the local conditions at the fracture site implying thereby the presence or absence of a compound wound. For compound fractures seen early, he advocated prompt reduction of the protruding bone using moderate extension failing which it was his practice to effect instrumental reduction using his Barrima commonly known as bone levers. In the event, the extruded bone could not be levered back into its place, cutting of the excess bone with an *minshar*(osteotome) was performed and the wound left open, packed with dressing soaked in wine. Splintage thereafter was done in a fashion so as to ensure a WINDOW at the site of the wound. If suppuration was to ensue, then it was advisable to place the limb in a position that would encourage gravitational drainage of the pus.

Minshar (Bone Cutting Instruments)

Minshar is a Arabic word that means Saw. Here, it has been taken for an instrument meant to cut the bone



For neglected compounded fractures with established infection of the protruding bone only topical application of the wound was recommended as the bone usually sequestrated within 20 to 30 days. In the main, this is akin to modern day management. In fracture treatment, the general wellbeing of the patient was not to be overlooked. Nutritious diet in the form of fowl, mutton, trotters, eggs, fresh vegetables and fish with rice and porridge possessing high protein and vitamin C content with abundant restorative properties were prescribed. For the tisuse atrophy of the limb, the treatment regime comprised passive massage, contract bath and application of pitch. Complications of fractures were equally recognized. For post traumatic myositis ossificans limiting the range of motion in a joint when seen early, he advocated immobilization until the callus had reduced or disappeared.

In delayed cases with hard callus he practiced surgical excision. For malunions he was reluctant to practice refracture and resetting of the bone as the results were generally poor. However, he conceded that if one is forced to undertake the correction of a malunion then perhaps CHISELLING (osteotomy) of the bone is likely to confer beneficial COSMETIC results.

Conclusion

These are observation and documentations of *Al zahrawi* an Islamic physician about nine centuries ago. Definitions and principals given by him still prove worthy and accurate with lots of advancement of instruments and techniques in the field of orthopaedics. Hence it may be conclude that *Al zharawi* was the pioneer and frontrunner of orthopaedics. Therefore, the credits must be given to him; and it is our ethical and moral obligation that he also must be remermbered for his inventions and discovery and reffered as a resource.

REFERENCES

Al- Ghazal S. K., “Zahrawi and Plastic Surgery”, ArabMed Journal, Issue 2, (12); 2002.

Alwi Hm. Nisar Ahmad “Jarahat e zahrawiyah” Hindustani press, Kanpur, India, 1947, PP: 189-231

Charles Rob & Rodney Smith and Georgebentley, “operative surgery orthopaedics, part 1, Butterworths, London, 1979

Maheswari, J. “essentials of orthopaedics 3rd edition”, Mehta publisher, 2007,

Basheer, M. Ahmed M.D. *Journal of the Tarrant County Medical Society* February 2009

Mohamerd Amin ElgoharyAnnals of Pediatric Surgery, Vol 2, No 2, April 2006, PP 82-87

Russell, R. C. G. and Co. Short practice of surgery, 23rd edition, ARNOLD, London 2000, PP: 312-313

Sarmiento A., Kinnan P., Murphy R.B. et al: '.Treatment of ulna by functional bracing". *J. Bone Joint Surg*. 58A, 1104, 1976

Spinks M. S. and Lewis G.L. "Albucasis on Surgery and Instruments", University of California Press, Berkeley $ Los Angeles, 1973.

Syyed Mohd Hasan Nigrami “tareekh e tib”, qumi council barayefarogheurduzuban, New Delhi ministry of HRD, 1989, PP:345-348

****