

Bone Setters' Gangrene

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ABSTRACT

Background: Gangrene usually supervenes following prolonged pressure of tight splintage by traditional bone setters (TBS) in the process of treating fractures. However, various complications such as blisters, pressure sores, Volkmann's ischaemia/ contracture, Crush syndrome and pregangrene occur by the same mechanism depending on degree of pressure and duration of splintage of the limb.

Method: This is a guest lecture delivered to resident doctors. Literature search was done through the internet and some unlisted journals and texts. Experiences of various institutions in Nigeria and abroad concerning bone setters' gangrene were elucidated. Attempt was made to broaden the concept of bone setters' gangrene to include all complications that arise through the same mechanism. The aetiology, pathophysiology and treatment of the various conditions were highlighted and the solution and way-forward suggested.

Result: The various health institutions recorded unacceptably high percentage of amputations secondary to bone setters' gangrene e.g. Zaria - 57% to 63%, Jos - 60-77.8%. Enugu recorded mortality of 26.7% while Banjul had 11.1% mortality in their series. Nearly all the series suggested education of bone setters as a solution.

Conclusion: A different approach to limiting bone setters' gangrene is suggested such as condemning bone setters' practice and expanding orthopaedic care.

Key words: Bone setters' gangrene; traditional splintage amputations; complications.

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INTRODUCTION

Gangrene, by definition, is death of gross part of a body in continuity with living tissue. The term "Bone Setters' gangrene" is a recent coinage that describes iatrogenic gangrene, largely avoidable, arising from activities of Traditional Bone Setters' (TBS) attempt at management of fractures.¹

Whereas the Traditional Bone Setter (TBS) as used in this context, is one who undertakes management of fractures empirically or by experience acquired by local tutelage without any formal medical education and not in accordance with the standard principles of orthopaedic practice. The fact that an attempt has been made to name

the condition as an entity supposes that the problem of bone setter's gangrene is such that it can no longer be ignored by the surgeon.

The incidence is however not known. Factors responsible for absence of such statistics include secrecy, reluctance to give information by both victims and the Traditional Bone Setter, loss to orthodox practice among fatal cases, etc. Various hospital based studies have attempted to elucidate the scope of the problem but this could not be regarded as representative of the entire incidence.²

SCOPE

In Zaria, a review of 118 limb amputations over a 10 year period by Yakubu A. et al showed that the major indication for limb amputation was trauma and gangrene following post-fracture splintage by traditional healers.³

Garba and Deshi, working in the same institution some years later found 63.2% of 225 limb amputations occasioned by TBS and noted that most of them were avoidable.³ Yakubu, Muhammad and Mabagunje, reviewing a larger series of 320 limb amputations documented 57% of cases indicated by post-fracture TBS splintage.⁴

In Jos, Onumiya et al studied amputations in two regional hospitals and found sixty percent indicated by bone setter's gangrene out of 100 cases.⁶ Kidmas, Nwadiaro and Igun noted 77.8% of amputations in children below 16 years indicated by Bone Setter's splintage of fractures.⁷

Nwankwo and Katchy working in Enugu reported fifteen (15) consecutive cases of Bone Setter's gangrene over a five year period with a mortality of 26.7% and noted that those were unjustifiable outcome of treatment of such fractures.⁸

Bickler and Sanno-Duanda reporting from Banjul-Gambia treated nine cases of bone setter's gangrene over two years and recorded one mortality.⁹ It is obvious that the incidence is variable in various localities as many studies reflect. In Addis Ababa, Ethiopia, Eshete M. working at Arba Minch Hospital experimented with offering one-day instructional

courses to 112 traditional bone setters and local health attendants. He noted a drop in the number of amputations from 49 to 25 and those indicated by bone setter's gangrene dropped from 25 to 7 over a two-year period.¹⁰

PATHOPHYSIOLOGY

The TBS usually treats fractures by scarifications at the fracture site, and massage of animal fat or oil mixed with decoctions from roots and leaves and splintage using woven sticks tied together.^{2,11} The mat, made of sticks or in some places Chinese bamboos, is usually tightly bound to prevent movement of fragments since only the fractured bone segment is held. This constitutes a wide tourniquet at high pressure resulting in vascular compromise, ischaemia of muscles, nerves and pressure on skin and bony prominences, resulting in a number of complications or set up a vicious circle that might end up in gangrene and death.^{2,12}

The scarification marks and unhygienic working environment predispose to infection. The ischaemic conditions favour invasion by anaerobic organisms.

For all practical purposes, the various conditions that could result from the same mechanism include the following:

- a. Blisters.
- b. Pressure necrosis of skin leading to pressure sores.
- c. Volkmann's ischaemia leading to Volkmann's ischaemic contracture.
- d. Crush Syndrome, if the splintage involving e.g. proximal thigh, is released after several hours.
- e. Pre-gangrene, a situation which may be reversible with adequate treatment or proceed to frank gangrene.
- f. Gangrene may supervene and may be dry or wet. This comprises a number of conditions viz. Clostridial myonecrosis, Streptococcal myonecrosis, anaerobic cellulites and ischaemic death of tissues with or without microbial invasion.¹³

It is pertinent to point out that it is not only *Clostridium welchi* that produce gas gangrene. The gangrene of the limb may arise consequent upon invasion by gas gangrene organisms or ischaemic death of muscles may be infected by other organisms.

TREATMENT

Diagnosis of the condition is important. Pertinent steps include good history and physical examination with special attention to color of skin, capillary refill, pain, peripheral pulses, and temperature.

The first step in the treatment of bone setters' gangrene is the removal of the splint and observation. Subsequent steps depend on the specific complications seen; pressure necrosis and sores are debrided and dressed; Volkmann's ischaemia is treated by fasciotomy. For crush syndrome, intravenous fluids are given and the urine alkalinized using sodium bicarbonate.

In pre-gangrene, the patient is observed and the contralateral limb dipped in warm water to induce reflex vasodilatation. High doses of antibiotics are given for gas gangrene and incisions made to let out gas. Debridement here includes amputation which is usually life-saving.¹²

DISCUSSION

It is necessary to point out that the methods of Traditional Bone Setting encourage gangrene.

Firstly, they treat all fractures the same way without investigation.^{2,12} They are empirical and make unattainable claims while refusing to acknowledge their limits. The use of rigid tight splintage without the appreciation of the anatomy and physiology of blood flow makes gangrene an ever present danger in their practice.²

They also dabble into treatment of open fractures and make scarification on the skin in closed fractures under unhygienic and septic conditions.^{2,10,12} The high cost of orthodox fracture management, its relative non-availability to most rural settings, the level of illiteracy of our population coupled with propaganda of TBS have ensured their continued patronage.^{2,4,6,12,14}

On the other hand, orthodox medicine has hitherto shied away from proactively condemning this practice and educating both the public and government concerning the implications. This is because the doctor does not want to be drawn into a state of competition with TBS as is erroneously created¹.

The seeming herculean task of expanding orthopaedic care to be all embracing makes the government reluctant in taking steps to stop bone setters' practice.

Consequently, traditional or herbal medicine is grouped together with Traditional Bone Setting. The former utilizes herbal drugs which have the capacity of altering physiological or pathological processes while the later

relies only on the experience of the bone setter. While herbal medicine could be improved upon and the drug extracts of plants incorporated into orthodox management, it is difficult to say the same of traditional bone setting.^{2,11,14}

WAY FORWARD

The unacceptable level of limb loss, subsequent destitution, morbidity and mortality from bone setters' gangrene is well known to orthodox medical practice^{1,3,5,6,7,10}.

There is need to educate the public via the media as a health campaign concerning the very serious outcome of Traditional Bone Setting and check their unrestricted propaganda.

Introduction of fracture management into the scope of primary health care delivery system would ensure wider coverage. This might require modification of medical curriculum and introduction of postgraduate diploma in traumatology to train middle level specialist manpower to manage fracture nationwide.

There is no doubt that orthodox medical practice owes our public a responsibility of protection from unacceptable practice. This would likely be achieved by concerted enlightenment campaign^{1,6,10}.

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