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Corrosive Injuries to the Oesophagus – Need to Stem the Tides

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ABSTRACT

Background: This study reviewed cases of corrosive oesophageal injuries that presented in our hospital, aetiological agents associated sequel and proffer ways on how the menace and its catastrophic effect could be stemmed in our locality.

Methods: A 15-year cross-sectional descriptive review of patients that were managed for corrosive ingestion at UNIOSUN Teaching Hospital, Osogbo, Osun State, Nigeria between December 2009 to November 2024

Results: A total of 46 patients consisting of 36 males and 10 females with M: F ratio 3.6:1 and age ranged from 2 years to 65 years. Majority 39.1% were children 1 – 15 years followed by young adult 16 – 30 years 34.8%. The mode of ingestion was accidental among the children and by deliberate self-harm among the adults. Caustic soda ingestion formed the preponderance of the corrosive ingested 76.1% and majority 60.9% presented late. All the patients were admitted and managed with intravenous fluids, antibiotics, steroids, H-2 receptor blocker. Those who presented early had nasogastric tube inserted for stenting and feeding. Twelve patients (26.1%) had psychiatric illness and 30.4% developed strictures, 5 patients with short segment stricture were managed with serial oesophageal dilatation. There were 3(6.5%) mortalities secondary to oesophageal perforation

Conclusion: Corrosive injuries to the oesophagus are a serious public health issue associated with high morbidity and mortality in our locality. Illiteracy, poor socioeconomic status/ economic burden, psychiatric illnesses are some factors contributing to the high incidence of this problem. Suggestions on steps to stem the tides of this menace in our locality were discussed.

Keywords: Corrosive injuries, Caustic ingestion, Oesophageal stricture, Dysphagia, Oesophageal perforation.



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INTRODUCTION

Corrosive injuries to the oesophagus are still a serious public health issue especially in some developing countries of the world^{1,2}. The injuries predominantly affect the upper gastro intestinal tracts, from the oral cavity to the stomach¹. It is a devastating condition and, in severe cases, it is associated with significant morbidities and mortalities^{3,4}. In some countries, the incidence have decreased compared with the past while in many developed countries like USA, the condition is very rare, this is not usually the case in many developing countries where the it remains a serious health issues^{2,4,5}.

The ingested chemicals which could either be an acid, or an alkali, have high corrosive potentials. In the early acute phase, the injury may range from mild inflammation to a severe form including perforation or even death¹⁻³. In the chronic stage, stricture formation is common which often leads to dysphagia and malnutrition^{3,4}. Although, a corrosive agent causes destruction of the tissue with which it comes in contact with, the injury suffered depends on the offending agent¹⁻³. While acid causes coagulative necrosis with formation of an eschar. The eschar in turn acts as a barrier for further penetration of the acid and hence limiting the depth of injury. Alkalies, on the other hand, causes liquifactive necrosis with tendency to cause more severe and transmural injury to the oesophagus or any tissue it comes in contact with. Also, tendency to swallow larger quantities are common in alkalies due to its tasteless and odourless, thus, alkalies have increased risk of adjacent organ injury^{3,4}. Acids on the other hand have a pungent odour, noxious taste and are less viscous. This account for the smaller quantity frequently ingested which is usually vomited immediately with injury to the lips and the oral cavity in most cases.

In children corrosive ingestion is most frequently accidental. This is particularly so among low-income families especially in developing countries where there is no regulation or legislation that guards or protects against it⁴⁻⁶. In some of those households, caustic soda is used for making soap by local/ traditional methods. Carelessly, caustic sodas are kept in bottle water container, or other regular containers for liquids. Those bottles or containers can be confused with water or alcoholic beverages and can be ingested accidentally by the children in such households^{6,7}.

In adults, corrosives are usually ingested either for suicidal attempt or for medicinal purposes⁶⁻⁸. This makes the injuries to be more serious among the affected adults because they are intentional⁴. The ingestion leads to destruction of tissue which can result in complications such as respiratory distress, oesophageal and gastric perforations, septicaemia and death^{5,7}. Presentation and final outcome of corrosive ingestion depend on many factors which includes the concentration and the quantity of corrosive agent swallowed, duration of contact of the chemical with the GIT, and the quality of care given at the initial management of the patient at presentation¹⁻⁴.

Caustic ingestion and its catastrophic effects have been stemmed in many developed countries due to proactive and decisive actions taken against it. This is usually not the case in many developing countries including Nigeria where poverty, ignorance, ineffective or non-existence legislation and or ineffective implementation predominate. This study reviewed cases of corrosive oesophageal injuries that presented in our hospital, aetiological agents associated sequel and proffer ways on how the menace and its catastrophic effect could be stemmed in our locality as well as other developing countries of the world.

MATERIALS AND METHODS

The study is a 15-year descriptive chart review of patients that were managed for corrosive oesophageal injuries at UNIOSUN Teaching Hospital, Osogbo, Osun State, Nigeria between December 2009 to November 2024. The patients' information's were retrieved from their medical records in accidents and emergency, from the ward, clinic and theater. Data retrieved from the case records included patients' age, sex, type of corrosive substance ingested, duration between corrosive ingestion and presentation at the hospital, predisposing factors for ingesting corrosive agent, treatment modality and outcome. Excluded were those with incomplete information and those whose case files could not be traced. The information obtained was entered into a spread sheet and analyzed using the Statistical Product and Service Solutions (SPSS) software IBM SPSS Statistics for Windows, version 20 (IBM Corp., Armonk, N.Y., USA). Descriptive statistics was used to ascertain the frequencies and distribution of the variables. The data was presented in simple descriptive forms as proportions using tables and graphic chart

RESULTS

There were total of 46 patients admitted and managed for corrosive oesophageal injuries during the period under study. The patients consist of 36 (78.3%) males and 10 females (21.7%) with M: F ratio 3.6:1. Their ages ranged from 2years – 65years with a mean age of 23.7years. Majority 18 (39.1%) were children 1 – 15 years followed by adolescent / young adult 16 – 30 years 16 (34.8%). There were 2 peaks, the first was 1 – 10 years which formed the preponderance of the affected population 14 (30.4%) and the second peak was 21 – 30 years 11 (23.9%) Table 1 shows age and gender distribution of participants. The mode of ingestion in all the children was accidental while among the adults, majority were by deliberate self-harm or suicidal attempt. Among the adolescent / young adults the mode of ingestion is combination of accidental/ suicidal and for therapeutic usually from spiritual homes. Figure 1 shows the age group and the mode of ingestion. Caustic soda ingestion formed the preponderance of the corrosive ingested 35 (76.1%) and acid accounted for 6 (13.0%) while spiritual water/ herbs containing varied concentration of corrosive/other substances accounted for 5 (10.9%). Eighteen patients (39.1%) presented early while others presented after the first 48 hours (late presentation). Those that presented late came after onset of one or more various complications (odynophagia, dysphagia/stricture +- weight loss etc). Figure 2 shows the various complications recorded among the patients.

All the patients were admitted and managed with intravenous fluids, antibiotics (ceftriaxone & metronidazole), steroid (dexamethasone) H-2 receptor blocker (omeprazole). Those that presented early had nasogastric tube inserted for stenting and feeding. Depending on the time of presentation of those that presented late, some had NG tube inserted while some had barium study to determine whether stricture had developed or not. Twelve patients (26.1%) had psychiatric illness ranging from depression to psychotic illness. Fourteen patients (30.4%) developed/ oesophageal stricture, 5 patients with short segment stricture were managed with serial oesophageal dilatation while others with long segment or multiple segment strictures or perforations were referred to cardiothoracic surgical unit. There were three mortalities secondary to oesophageal perforation during the period of this study. NB: we were unable to follow up the patients that were referred to cardiothoracic surgical unit because it was in

another center. This was because we do not have cardiothoracic surgical unit in our center.

Table 1, Age and gender distributions

Age Group (years)	Frequencies	Percentage
1 - 10	14	30.4
11 – 20	9	19.6
21 – 30	11	23.9
31 - 40	4	8.7
41 – 50	6	13
51 - 60	1	2.2
>60	1	2.2
Total	46	100

Gender	
Male	36
Female	10
Total	46

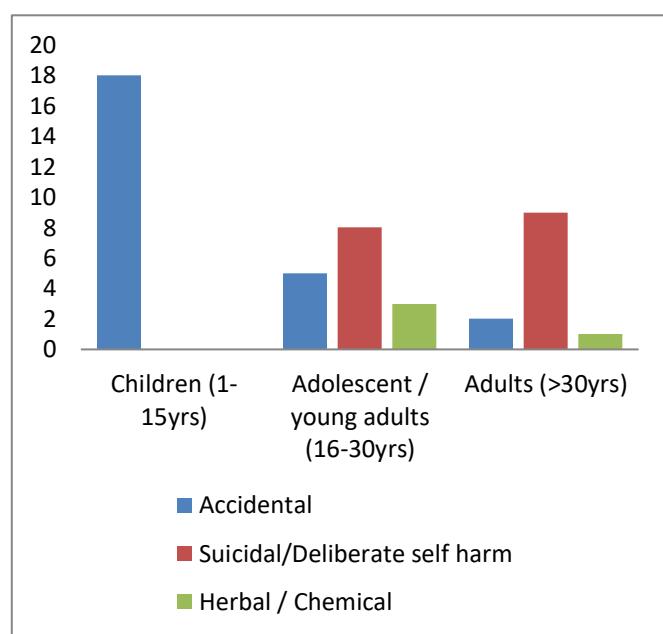


Figure 1: Age group and mode of ingestion

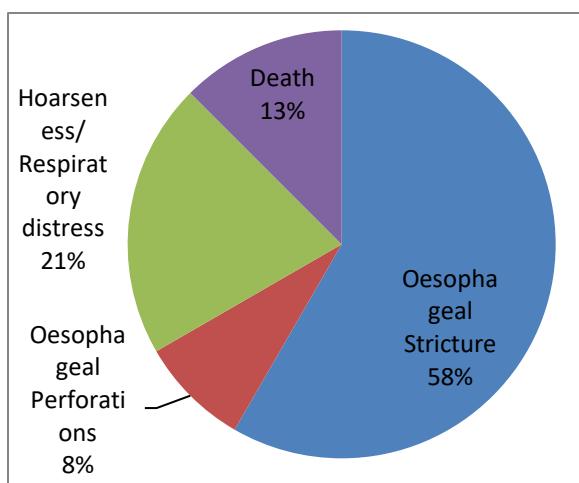


Figure 2 Complications of corrosive injuries seen among 24 patients

NB: Total Oesophageal perforations = 5 [3 died, 2 survived], Total complications = 24/46 (52.2%)

DISCUSSION

Corrosive ingestion and its catastrophic and age long morbidity is still a challenging issue in many sub-Saharan Africa countries including Nigeria ⁶⁻⁹. The consequence / complications arising from this menace are becoming a serious concern in many West African countries ⁷⁻⁹. Across the length and breadth of Nigeria, this disturbing issue had been reported. Onotai et al ¹¹ in Port-Harcourt, southern Nigeria concluded that Corrosive injury is a major surgical emergency in the society which carries a major risk of several complications. Ekpe et al ⁸ in Akwa Ibom a southern state in Nigeria opined that, Inspite of the fact that accidental caustic ingestion is a preventable problem, it has persisted in rural Nigerian communities while Ufore et al ¹² in Bauchi, Northern Nigeria reported that corrosive ingestion is a serious public health issue associated with high morbidity and mortality in their locality. This concern concerning corrosive ingestion had been reported in Ghana, Ivory Coast and some other African countries ^{5,7,9}.

In consonant with other published studies, our study discovered children (1-10years) as the most affected age group. This was followed by the second peak in young adult (21-30years). A similar pattern was reported by Ufore in Northern Nigeria ¹². Onotai in Port Harcourt, although, reported a bimodal peaks in the first and third decades of life, majority 76.7% of the patients they managed in their study were however adults ¹¹. A study

from Akwa Ibom state, south – south Nigeria, however, presented the entire corrosive ingestion occurrence in children 1-18 year with peak incidence among 1-3years age group ⁸.

Children are usually innocent and have explorative tendencies without restriction on what they put in their mouth. Also, children in their first decade of life have developed skills and they usually know where to locate and drink liquids; however, they cannot distinguish between harmful or toxic and non-harmful liquids ^{12,13}. Hence all the children in the present study had accidental corrosive ingestion which was similar to reports from most published studies ^{12,14}. Most of these childhood corrosive ingestions occurred in the neighborhood. In our locality especially among many poor families, communal living is a common practice, alkali is usually kept in containers without sealed covers by people that manufacture local soaps, hence accidental ingestion from mistaken identity was the mechanism of ingestion among the children in the present study. This scenario is usually the pattern in most published studies. Botwe et al ⁷ in Ghana reported that majority of children with corrosive ingestion got access because it was stored in soft drink and water bottles within the premises of their house or kitchen while some children got access to the left-over soda because the soap-makers failed to adhere to good storage and disposal practices. There is therefore a need for stricter measure against this trend. Public awareness about this menace should be intensified.

There should also be a forum for training and enlightenment of people involved in local soap making including those selling caustic raw materials about the dangers improper storing and packaging of caustic materials. Legislation on caustic materials may involve colour coding of the packaging, child proof cap of the container and stricter punitive measures to guard against careless storing or packaging of caustic materials.

Consistent with findings from other studies, our findings indicated male patients as the most (78.3%) affected gender. Similar findings were reported by Ekpe et al. ⁸ with male predominance of 81.25% and Onotai et al ¹¹ 80%, Ufore et al ¹² in Northern Nigeria reported 60% male predominance and Kone et al. ⁹ in Ivory Coast reported male predominance of 59%. Inquisitiveness, explorative tendencies, stress of life and depressive illness were



identifiable factors that may predispose male to corrosive ingestions than their female counterparts.

The third decade of life presents a special scenario as seen from the present study. They form the second peak of the age group affected. The pattern of ingestion is also of note in this age group. Suicidal intent and corrosive laden herbal preparation as seen in them may be a pointer signifying poverty, frustration, depression and psychotic illness. Kone et al⁹ in Ivory Coast reported that caustic ingestion in their region primarily affected young individuals in a suicidal context. A similar study had opined that the predisposing factors to suicidal ideation and use of corrosive substance to commit suicide include psychiatric illnesses, substance abuse, chronic illness, sexual abuse and economic burden^{6, 11, 16}. Some of the affected patients in our study attempted suicide as a result of either a poor academic performance or failure to secure a living job. In fact, some of the mortalities recorded in the present study were cases of students who became frustrated and subsequently ingested corrosives for suicidal intent because their parents could not afford their school examination fees. This scenario calls for urgent action in form of unique governmental policy for the youths toward poverty eradication. Parental and guardian support or counseling geared toward building the youth up in order to face any challenge without endangering their future life. Our educational system also needs to be re-formulated toward building graduate that will be self-reliant. Our findings also revealed that 75% of the affected adults ingested corrosives for deliberate self-harm / suicidal intent. Further probing on psychiatric evaluations indicated that majority of those adults had background history of depression and psychotic illnesses. Illiteracy, poor socioeconomic status/ economic burden, psychiatric illnesses and corrosive ingestion had been found to be interwoven challenges in West African sub region ^{5, 6, 7, 12}.

Therefore, addressing this menace of corrosive oesophageal injury in the affected locality should be multidisciplinary involving the Government, Social worker/ Psychologists, Otorhinolaryngologists cardiothoracic surgeon as well as a good family support. Physicians especially psychiatrists should evaluate suspected adults thoroughly and if possible, evaluation of the suspected individuals should be introduced down to the primary health care level. Wider public

enlightenment on the issue should be of necessity. Stigmatization associated with psychiatric illnesses in our environment should be discouraged. Poverty eradication program of the government should be stepped up to reduce frustrations people face with resultant depressive/ psychological trauma. Although West African subregion was known for good family tie/ support, maybe, economic deprivation is impacting negatively on this, re-visiting such good virtue of family support should be encouraged most especially for those with psychiatric tendencies or those with suicidal ideation.

In alignment with reports from other studies, caustic soda was responsible for over 76% of the cases in the present study. A similar study in southern part of Nigeria had reported caustic soda as the main agent in 93.7% of their patients and that 87.5% of the affected parents were into local soap and detergent production. Botwe et al⁷ in Ghana reported 100% of their patients (mainly children) ingested caustic soda, Kone et al⁹ in Ivory coast had 53.85% prevalence of caustic soda ingestion among 39 patients who had upper gastrointestinal endoscopies performed for corrosive ingestion. Unregulated sale of caustic soda, poor storage and packaging, carelessness, poverty and illiteracy are some of the factors that had made this chemical notorious for caustic ingestion and its associated sequel due to easy accessibility. In the USA, legislative effort had made the incidence of corrosive ingestion almost nonexistence ^{17, 18}. The situation is however contrary in many African countries where corrosive agent was readily available and within reach of the affected patients due to unregulated usage of these chemicals and negligence on the part of those involved in local soap making ^{5 - 8}. Sale and use of corrosives especially caustic soda should be strictly regulated while every effort should be geared toward making the substance out of reach of children and those with psychiatric issues.

The trends of complications resulting from corrosive ingestion need to be properly addressed in order to ameliorate or prevent the morbidity and mortality associated with it. The spectrum of complication in the present study (figure 2) is similar to that reported by Ufore et¹² in Northern Nigeria. Also, the complication rate of 52.2% in our study was similar to 50% reported in southern Nigeria.⁸ Tettey and his colleague in their study in Ghana reported that 76.6% of patients with



Oesophageal Injuries that required surgical management were as a result of complications of corrosive injury⁵.

Also, the mortality rate of 6.5% in our study agrees with the report from Akwa Ibom⁸ and it is slightly less than 10% reported in Port Harcourt¹¹ and much lesser than the report from Bauchi¹², all in Nigeria. Most of these complications were associated with late presentations. A recent study from Ivory Coast reported that high proportion of severe lesions in corrosive oesophageal injuries is significantly associated with residence outside the city that may not present early to the hospital⁹. In the West African sub region, notable factors predisposing to complications especially stricture formation and oesophageal perforation include late presentations, deliberate ingestion for self-harm or suicidal intention, induced vomiting, ingestion of large volume of corrosive^{5, 8, 9, 10, 14}. Our findings also resonated well with the reports of other published study concerning these contributing factors to the development of oesophageal strictures and perforations. In fact, 5 of our patients initially discharged themselves against medical advice. Three of them re-presented later following total dysphagia secondary to oesophageal stricture. It is a well-known fact that corrosive Injury to the esophagus is intolerable and may be life threatening, hence prompt evaluation cannot be overemphasized in order to halt development and prevent progression of complications^{19, 20}. Awareness of the dangers of corrosive ingestion including need for early presentation to mitigate against complications should be extensively publicized^{20–22}. Government regulations permitting the sales and procurement of corrosive substances should be strictly enforced, and if not yet in place, should be enacted without further delay. Doctors or other health workers at remote or peripheral health centers should be encouraged to refer the affected patients promptly for early intervention. Efforts at poverty eradication and social support by the government and other NGO should be regularly advocated.

The retrospective nature of the present study is one of its limitations due to some missing information as well as some missing case files. Also, hospital-based nature of the study is identified a limitation bearing in mind that some affected patients may not present at the orthodox hospital setting for management. Further study to probe into the community which may be able to capture the

true picture of the affected individuals and its associated menace is therefore suggested.

CONCLUSION

Corrosive oesophageal injuries are still a prevalent public health issue in our locality and some other sub-Saharan African countries due to its associated morbidity and mortality. Illiteracy, poor socioeconomic status/economic burden, psychiatric illnesses and lack of effective legislations are some factors contributing to the high incidence of this problem. Awareness of the dangers of corrosive ingestion including need for early presentation, strict and effective legislation on sale and use of caustic materials, multidisciplinary management approach, poverty eradication program and good family support are some measures that can help to stem the tides of this menace.

Conflict of interest: The authors declare that they have no conflict of interest.

Sponsorship: Nil.

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