



## Evaluation of Pattern of Pet Animal Trauma at the Veterinary Teaching Hospital, Ibadan, Nigeria

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### SUMMARY

The record of 114 small animal trauma cases seen at the Surgery Unit of the Veterinary Teaching Hospital (VTH), Ibadan between 2008 and 2012, were studied to evaluate the pattern of trauma with reference to species, sex, age groups, causes of trauma, regional involvement, severity including fatalities, in order to develop a data base for the establishment of protocols for trauma patient care. Trauma cases ranked first and accounted for 46.3% of all small animal surgical cases presented during the period. Species involvement markedly favoured the canine species. Incidence of trauma was significantly higher ( $p < 0.05$ ) in males (60.5%) and younger (<3years/70.1%) than in females (39.5%) and older (>3years/29.9%) dogs respectively. Automobile accidents were the most frequent cause of trauma (78.0%), and had the widest regional involvement while the extremities (41.2%) was the most frequently injured area. Majority of the trauma cases reported tended to be moderate to severe in the scale of severity rating. Information on details of trauma care, intensive management and outcomes were poorly documented. The study revealed trauma to be a leading cause for dogs to

present as an emergency to the VTH and hence the need for appropriate trauma patient care system.

**KEY WORDS:** Pet animal, Trauma, Pattern, Veterinary Teaching Hospital, Ibadan.

### INTRODUCTION

Trauma is known to be a major health threat for humans and to be the leading cause of death in people under 35 years of age (Kolata, 1992). In human medicine there are journals devoted to the study of trauma. Injury is studied closely enough in human medicine that groups of injury due to a single cause are described, such as the triad of injury due to a pedestrian being struck by an automobile, where there is frequently concomitant femoral fracture or knee injury, a pelvic fracture and head injury occurring in the same person. The same cannot be said of veterinary medicine especially in Nigeria, While trauma is recognized, it is not studied in an organized manner.

Trauma is a disease problem that is the consequence of the transfer of energy into

an organism resulting in anatomical disruptions. Trauma has many causes and may affect any portion of an animal's body with various degrees and severity. It is therefore considered to be of great interest to surgeons that are required from time to time to diagnose the extent of the injuries and to correct the resulting anatomical damage (Holowaychuck, 2011, Hayes et al, 2010, Kolata, 1992).

An understanding of the mechanism of trauma and knowledge of its cause provide surgeons with a basis for diagnosis and for effective treatment of the pathology presented by a particular source of injury (Hayes et al, 2010).

In recent times, efforts at gaining more insight into the subject (of trauma) have resulted in a more robust definition and classification of trauma (Muir, 2006). A new definition of trauma describes it as any injury that occurs more or less suddenly as a result of an external force including but not limited to blunt force injury, penetrating injury, accelerating/decelerating injury and crushing injury (Simpson et al, 2009). This new description has also led to the emergence of a system of classification of trauma based on organ dysfunction. Studies that concern trauma now describe outcome and survival data for trauma cases with emphasis on multiple organ failure (MOF), coagulation and systemic inflammation response syndrome (SIRS) (Risselada et al, 2008).

Surgeons' recognition and understanding of patterns of trauma facilitates the establishment of a standard of care for trauma patients that is built around a standardized protocol for patient evaluation.

The protocol ensures that the most immediate life-threatening conditions are actively identified and addressed in the

order of their risk potential.

It is most expedient for the surgeon to embark on the initial evaluation of the trauma patient so as to stabilize it, identify life-threatening injuries, initiate adequate supportive therapy and, to efficiently and rapidly organize definitive therapy.

Traumas from various causes are recognized as frequent causes of injury to pet animals. However, there is paucity of information concerning the patterns of injuries associated with various causes of trauma in referral Veterinary centers in Nigeria.

This article presents the results of a retrospective study of trauma in pet animals presented to the Veterinary Teaching Hospital, Ibadan, Nigeria between January 12, 2008 and October 11, 2012 with particular reference to the species, sex, age groups, cause of trauma, regional involvement, severity and fatalities.

The study aimed at acquiring a general insight into pet animal trauma in the study location, and to contribute to and compare with similar data reported in other places. It will also contribute to the development of a data base for the establishment of protocols that would be helpful in the clinical management of trauma patients at the Veterinary Teaching Hospital, Ibadan.

## **MATERIALS and METHOD**

A detailed examination of all trauma case records presented to the VTH, Ibadan between January 12, 2008 and October 11, 2012 were included in the study. Cases included were classified by species, age groups, sex, cause of trauma, regional involvement, severity including fatalities. Fractures and luxations confirmed by radiographic examination were included in the study. Only cases with complete medical records were included in the study. Cases with incomplete medical records and those referred to surgery for suspected

conditions that need intervention (to resolve diagnostic conflicts) but did not pass through routine protocol of registration, clerking, examination and diagnosis were excluded.

Results so obtained from the case records were thoroughly analyzed and subjected to appropriate descriptive statistics.

## RESULTS

In the described 58-month period, a total of 313 small animal surgery cases were evidently presented at the Veterinary Teaching Hospital (VTH). Of these number only 246 were actually seen, examined and documented in case files, while the remaining 67 were only recorded in the ledger as having been presented without going through routine protocol of registration, clerking, examination and diagnosis. Of the 246 documented cases, only 193 had complete records with 114 being trauma cases. These 114 records represent 46.3.0% of all the examined, diagnosed and documented cases respectively, and are the subject of this study (Table 1).

### Species

Species involvement markedly favoured the canine species. No record of trauma to felines was documented.

### Age group

The distribution of trauma according to age groups is presented in Table II. The highest number of trauma cases was reported in dogs younger than 1 year (48.2%), followed by dogs with ages between 1 and 3 years (21.9%). Dogs older than 6 years had the least incidence of trauma (2.6%). Dogs older than 3 years tended to be less affected (29.9%).

### Sex

The distribution of trauma according to sex favoured the male population with 69 cases (60.5%) involving males while 45 (39.5%) involved females (Table II).

### Causes of Trauma

In the 114 cases reported, the causes of

trauma were divided into 6 (Table III). These included automobile accident, fight/bites, fall from height, gunshot, accidental wound and unknown. These reflected the categories of injury found in the study and did not in any way represent all the possible sources or causes of trauma. The most frequent cause of trauma was automobile accidents, accounting for 89 (78.0%) of trauma cases. The next most frequent causes were unknown with 8(7.0%) and fight/bite 7(6.1%) of the cases documented. The three causes (automobile, unknown and bite/fight) accounted for 91.1% of trauma cases reported in the study.

### Regional involvement

In this study, regional involvement was divided into six areas which included head/neck, thorax, abdomen, pelvis, spine and extremities. (Table III).

Lesions such as sprains which could not be demonstrated radiographically or by physical examination were excluded. The most injured area without regard to cause of trauma were the extremities accounting for 41.2% of the injuries. The pelvis was the next most frequently involved with 27.2% of the injuries.

Severity : In classifying severity of trauma in this study, a combination of 2 systems of injury scoring was adopted and modified. These included abbreviated Injury Scale (AIS) (Baker et al, 1974) which scored injury based on severity as: minor, moderate, severe but not life threatening, potentially life threatening but survival likely, critical with uncertain survival and unsurvivable injury. The 2nd system is the International Classification of Disease- 9 base Injury Severity Score (ICISS) that focused on anatomical distribution of injury on the basis of body region involvement demonstrable by physical examination and radiology (Osler et al, 1996).

Table 1: Types of surgical cases presented at the VTH (2008-2012)

	Frequency	Percentage (%)
Trauma	114	46.3
Caesarian section (C/S)	9	3.7
Hernia	7	2.8
Otitis	11	4.5
Caudectomy	22	9.0
Ovariohysterectomy (OVH)	17	7.0
Tumor excision	25	10.1
Orchidectomy	12	4.8
Aural Hematoma	27	11.0
Ear cropping	2	0.8
Total	246	100.0

Table II: Distribution of trauma among age groups and according to sex (2008-2012)

	Age group distribution (in years)					Sex distribution	
	<1yr	1-3yrs	3-6yrs	>6yrs	Unknown	Male	Female
<b>Frequency</b>	55	25	14	3	17	69	45
<b>Percentage (%)</b>	48.2	21.9	12.3	2.6	14.9	60.5	39.5

Table III- Trauma distribution by body region and specific causes

	Automobile accident	Flight/Bite	Fall from Height	Gunshot	Unknown	Accidental Wound	Total
Head/Neck	11	4	-	-	-	-	15(13.2)
Thoracic	8	1	-	1	-	-	10(8.8)
Abdominal	5	-	-	2	-	1	8(7.0)
Pelvic	33	-	1	-	5	2	31(27.2)
Spinal	3	-	-	-	-	-	3(2.6)
Extremities	29	-2	1	-	3	2	47(41.2)
Total	89(78.0)	7(6.1)	2(1.8)	3(2.6)	8(7.0)	5(4.4)	114

\*Percentages in parentheses.

Majority of the injuries reported in this study were classified as moderate (51.8%), while 39.4% and 8.7% were classified as severe and fatal respectively (Table IV). None of the 114 cases reported had minor injury. Injuries to the extremities and pelvis tended to be the most frequent and tended to be moderate to severe in severity.

## DISCUSSION

This study reported the pattern of trauma in pet animals presented to the veterinary teaching hospital, University of Ibadan between 2008 and 2012. The choice of the VTH was considered most appropriate for the study in view of its status as a referral centre for most practices in South-West Nigeria in general, and Ibadan in particular.

Table IV-Classification of severity of trauma based on modified and adapted method of Osler et al, 1996

	Automobile	Gunshot	Bite/Fight	Fall from height	Accidental Wound	Unknown	Total
<b>Minor</b>	-	-	-	-	-	-	-
<b>Moderate</b>	42	-	6	1	5	5	59(51.8)
<b>Severe</b>	37	3	1	1	-	3	45(39.5)
<b>Lethal/Fatal</b>	10	-	-	-	-	-	10(8.7)

Incidence of trauma ranked first and accounted for 46.3% of the categorized surgical cases presented during the period. Despite the non-inclusion of some cases due to incomplete records, and the observation that most animals that could not immediately rise and walk away from the site of accident as a result of severe injuries to vital organs and/or bones are seldom presented for treatment, we still consider the high incidence recorded in this study, to be of great clinical significance and a well-accorded justification for the study.

Compared and contrasted with the reports of Kolata, 1992; Streeter et al, 2009; Simpson et al, 2009, the result of this study showed that there are variabilities in the distribution of trauma in the various systems of the canine body. This may be related to the variable causes of trauma in dogs in different geographical areas. While majority of trauma recorded in this study were associated with automobile accidents, other causes, such as bites from fight, fall from height, gunshot and accidental wounds were also reported as causes of trauma in dogs (Kolata, 1992, Simpson et al, 2009, Hayes, 2010).

The higher incidence of trauma in male dogs than female recorded in this study is consistent with other reports (Kolata, 1992, Simpson et al, 2009). This observation may not be unconnected with

the fact that male dogs have greater propensity to roam on the roads and are exposed to higher risk of automobile accidents. It could also be due to differences in male to female ratio in the study location.

Higher frequency of trauma was reported in younger dogs than older ones, as earlier documented by Kolata, 1992 and Simpson, 2009. This observation, in the opinion of the author may be ascribed to lack of experience on the part of younger animals in coping with their environment, as compared to older dogs, especially with reference to the study location. Another explanation could be that there are just much younger dogs in the population than older dogs, or people not bothering to present older dogs for treatment.

Multiple regional involvements per incident are most likely seen in trauma due to automobile accidents (Streeter et al, 2009). The extremities and pelvic regions tended to be most prone to trauma caused by automobile and accidental wounds.

Causes of trauma reported in this study varied widely in severity (Hayes, 2010). The largest number of fatalities occurred in animals injured in the thorax or abdomen, as a result of automobile accidents. Other causes of trauma inflicted injuries varied from moderate to severe in the scale of severity categorization. The level of fatalities and organ involvement reported

in this study may not be a true reflection of the actual situation, as most animals that are unable to immediately rise and walk away from the site of accident as a result of severe trauma to vital organs are seldom presented for treatment in the study location. Equally, animals that sustain injuries not accompanied by any visible anatomic abnormality are rarely referred for treatment. Information obtained from case records was grossly inadequate to evaluate vital organ involvement and assess trauma severity appropriately.

Aside the cases of trauma of unknown causes reported in this study; the report is not unmindful of cases that were presented but not documented including those that were never presented to any hospital for various reasons, such as poor attitude to animal welfare, financial/economic consideration and poor prognosis in severely injured animals. This group should be factored into studies regarding trauma epidemiology and the quality and quantity of trauma care in a given population.

Majority of trauma cases reported in this study were treated on an outpatient basis. Reasons for this may be due to dearth of facilities for hospitalization and intensive care rather than severity of cases. To some clients, cost implication may have informed the choice.

Characterization of injury severity is crucial to the scientific study of trauma. Such exercise helps in predicting survival guide in decision making with respect to allocation of resources to trauma patients (Breslow and Badawi, 2012). An accurate method for quantitatively summarizing injury severity has many potential applications among which is the ability to predict outcome from trauma.

The method used in scoring severity of trauma in this study could not be said to be most appropriate because of paucity of information. The use of a modified and

adapted method of grading based on the AIS and ICISS was chosen to probably bridge the lacuna due to limited information and poor documentation. While AIS focuses on the severity of injuries ICISS is anchored on the number of body regions involved. The Animal Trauma Triage (ATT) scoring system provides a statistically validated stratification of veterinary trauma patient population based upon severity of injury. (Rocker et al, 1994). This could be used objectively to predict the likelihood to survive a traumatic incident, would have been more appropriate. The outcome of this study underscores the imperatives of clinical documentation in trauma research. Despite the high prevalence of trauma cases at the study location, we observed that appropriate facilities that could provide team-based definitive care for trauma patients are either inadequate or non-existent. In order to provide trauma patients with access to the most comprehensive resources for their treatment, specialist and equipment must be available all the time including critical care, surgery, anesthesiology and radiology (Osler et al, 1996). Establishment of protocols for trauma patients as well as integration of specialist in neurology, clinical pathology, internal medicine and nutrition into the trauma care team (Raumet al, 2009) is not yet in place at the veterinary teaching hospital.

Recent advances in trauma research have further elucidated the significance of integrated and coordinated approach to trauma care. Animals which sustain trauma may develop a systemic inflammatory response that may lead to multiple organ failure (MOF) (Hayes et al, 2010; Holowaychuk, 2011). Equally, studies have documented increased concentrations of pro-inflammatory cytokines (TNF, IL-6) in dogs with trauma induced systemic inflammation (Hayes, 2010). Similarly, acute respiratory disease

syndromes (ARDS) have been documented in dogs with trauma (Risseladaet al, 2008). Other organ dysfunctions of significance that have been ascribed to trauma include metabolic, renal, hepatic, cardiovascular and gastrointestinal dysfunction (Muir 2006). The use of scoring system in veterinary medicine as a clinical tool to benchmark performance and development of protocols for trauma patient monitoring and management has become a standard practice in trauma studies (Rockaret al, 1996; Risseladaet al, 2008).

The present study has revealed trauma to be a leading cause for dogs to present as an emergency to the VTH. Animals presented had a wide variety of injuries arising from different causes, with considerable differences in prognosis, depending on the type of injuries and body regions affected. Definite protocols regarding scoring system, patient monitoring and management were found to be lacking in the case documentation.

Since the study is based on limited data obtained from one study location, the outcome may probably be speculative and a subject for further studies.

#### Recommendations

In order to improve the outcomes of trauma patient care, we recommend the following:

- Establishment of a protocol for trauma patient monitoring and management.
- Knowledge of the pattern of trauma
- Adequate preparedness for trauma emergencies on the part of the hospital and staff as well as a team approach to trauma cases.

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