Case Report

The dangers of pets and horses, animal related injuries in the Emergency department

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ABSTRACT

Introduction: Every year patients present to the emergency department due to bites, scratches and falls caused by animals. Although bite and scratch injuries have been described in literature, the exact number of patients that visit the emergency department due to all animal related injuries has never been described before.

Methods: A retrospective analysis of all emergency department visits throughout a 1-year period was performed from April 2015 until March 2016.

Results: 516 Patients were treated at the emergency department because of animal related injuries. Most were female and the median age was 38 years. The animals causing most injuries were horses, followed by dogs and cats. Animal related injuries more often caused fractures (n = 165) or contusions (n = 171) compared to wounds (n = 135). No lethal injuries were recorded. However, three animals did not survive the event.

Conclusions: The incidence of animal related injuries is 2.8% and this is probably an underestimation. The injuries have noteworthy origins and have potentially severe physical injury as result. Awareness in the general population on the potential dangers of pets and horses could reduce the number and severity of animal related injuries.

Introduction

In the USA approximately 85 million families own one or more pets, mostly dogs [1]. In the Netherlands, about 15 million animals were kept as a pet in 2014 on a population of 17 million inhabitants [2].

Pets are mostly kept for a persons company or entertainment. Keeping animals however, poses potential danger. Every year 4.5 million people are bitten by a dog in the USA; 750.000 Of them serious enough to require medical attention. 4% Of those patients are admitted to the hospital for further treatment [3,4]. Dogs cause most animal related injuries and the incidence of animal related injury is significantly higher among children and males [5–9].

In current literature, many descriptions of dog and cat bite related injuries have been published, as well as injuries due to horseback riding. A 1-year overview of all animal related injuries at the emergency department (ED) has never been published. Therefore this retrospective study was conducted, analyzing all emergency presentations caused by animals in a 1 year period.

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Materials and methods

To get insight into animal related injuries at the ED, all ED visits to a large teaching hospital in the Netherlands, a level-2 trauma center, were retrospectively reviewed. All animal related injuries from April 2015 to April 2016 were retrieved. Patient charts on all ED visits (n = 18,550) were hand searched in the digital patient record (Epic™). Patients were included in this study if they visited the ED due to a trauma in which an animal was involved. Data on the nature and extent of the injury, were reviewed and analyzed. Characteristics evaluated in this study were; age and gender of the patient, type of animal causing the injury, type of injuries, performed diagnostic tests and treatment.

Data were analyzed with IBM SPSS Statistics for Windows, Version 24 (Armonk, NY: IBM Corp.) Released 2016. Patient data are presented in numbers with percentages. Means with standard deviation for normally distributed data and medians with interquartile range (IQR) for non-normal distribution are presented.

Results

In the period April 2015 to April 2016, 18,550 surgical patients visited the emergency department. Patient characteristics are listed in Table 1. 516 Patients visited the ED because of animal related injuries (2.8%). Median age of the patients was 38 years (IQR: 32–63). 105 Patients were male (20.3%), 411 were female (79.7%). Median age was 51 years (IQR: 32–63 years) for males and 30 years (IQR: 15–55) for females. Of all patients who visited the ED because of animal related injuries, 141 were under 18 years of age (27.3%).

245 Animal related emergency department visits were due to horses (47.5%), followed by dogs and cats (Table 1). Other animals involved in traumas were rodents (rabbits, mice), birds, cows, donkeys and deer. In three cases more than one type of animal was involved in the incident; these cases all concerned a clash between dogs and horses in which the dog attacked the horse while the patient was horseback riding.

In females, ‘falling off an animal’ was the most frequent mechanism of trauma, 148 patients (36.0%), followed by 66 patients being bitten or scratched (16.1%). 51 Males were bitten or scratched (48.6%), followed by 17 patients being pulled over or entralled by the animal (16.2%).

Upper extremities were injured 265 times (51.4%), followed by 118 injured lower extremities (22.9%). 37 Patients had multiple injuries (7.2%, Table 2). A combination of fractures and wounds of the upper extremity, of which mostly digits, was present in 25 patients. In 21 patients, other kinds of injuries were described as joint luxation, ligament injury, pneumothorax, nerve damage and abdominal injury.
An X-ray was performed in 334 patients and 36 patients received a CT-scan, mostly because of painful cervical vertebrae. Also, 4 MRI-scans were performed due to injured ligaments, mostly of the knee. 58 patients (11.2%) were admitted to the hospital, for observation, intravenous antibiotic treatment or surgery. Fracture treatment was necessary in 186 patients (36.0%) and wounds were treated in 124 patients (24.0%). 183 patients (35.5%) were solely treated at the emergency department, those cases mainly considered contusions and small wounds. Follow up took place at the outpatient clinic or by the patients’ general practitioner or house doctor, according to the size and severity of the wound.

Wound management primary took place at the Emergency Department. More extensive wounds were treated at the operating room, were the wounds were rinsed and debridement was performed.

In total, 43 patients (8.3%) had surgery (Table 2). In 35 patients (6.7%) surgical treatment of fractures or injured ligaments was performed. Surgery was performed because of 22 dog related injuries, 18 horse related injuries, two cat related wound infections and a fracture of the patella caused by a collision with a deer.

Antibiotic treatment was prescribed in 102 patients (19.7%) as prevention or treatment of infection of contaminated wounds. All patients who sustained wounds or open fractures due to animal related injury, received tetanus prophylaxis when their vaccination state was insufficient. In 66 patients (12.7%) antibiotic treatment was prescribed as prevention or treatment of infection in case of bite injuries by dogs. 16 Patients (3.1%) were treated for cat bite injuries, 15 (2.9%) for wound due to bites of horses, and two patients (0.4%) were treated because they were bitten by rabbits. The other three patients who received antibiotics were treated because of contaminated wounds with other causes. For example: a fall of a horse with a contaminated wound, a patient whose scooter slipped away while avoiding a crash with a deer and a veterinarian who developed a paronychium after she cut herself while performing a castration.

In three cases permanent injury occurred; in all cases a part of a digit was amputated. A part of the finger was bitten off by a dog in two patients. One patients’ ring was entangled in the reins of a horse running wild, tearing off the digit of the patient.

There were only four job related injuries: a fireman who tried to save a cat from a tree and was scratched in the face, a postman who delivered a parcel through the mailbox and was bitten in his fingers by a dog, the veterinarian mentioned previously and a burglar who was bitten by a police dog.

Three animals did not survive the injury. First, a horse suddenly dropped dead and crushed his rider resulting in multiple fractures. Second, a patient collided with a rabbit while on his scooter and suffered multiple wounds and a contusion of his elbow. The rabbit did not survive the accident. Third, a patient was cycling with the leash of a dog in his hand, the dog ended up in the

### Table 2

| Body region and type of injury. | Fracture | Contusion | Wound | Combination | Otherwise | Total | Need for operative intervention |
|--------------------------------|----------|----------|-------|-------------|-----------|-------|---------------------------------|
| Upper extremity                | 111      | 49       | 88    | 11          | 6         | 265   | 23                             |
| Lower extremity                | 36       | 55       | 21    | 5           | 6         | 118   | 15                             |
| Head/face/neck                 | 4        | 15       | 23    | 2           | 1         | 45    | 0                              |
| Thorax/abdomen                 | 9        | 34       | 0     | 3           | 5         | 51    | 3                              |
| Multiple                       | 5        | 17       | 3     | 9           | 3         | 37    | 2                              |
| Total                          | 165      | 171      | 135   | 25          | 21        | 516   | 43                             |

### Table 3

Noteworthy examples of animal related injuries in the emergency department.

| Trauma                                                                 | Injury                                                                 |
|-----------------------------------------------------------------------|-----------------------------------------------------------------------|
| 1 A dog got stuck in a ditch. Patient jumped in the ditch to prevent the dog from drowning but unfortunately fell down fracturing his ankle. | Ankle fracture, treated by a cast for over 6 weeks.                   |
| 2 During a walk with the dog in a forest, the owner of the dog threw a stick against the head of the patient. | Wound of the head which needed suturing                                |
| 3 The patient wanted to show how the cat slipped and fell down, but she fell down herself and broke her arm. | Forearm fracture.                                                     |
| 4 The patient was in a moment of anger and hit the wall with his hand. The dog was scared up and bit the patient. | Boxer’s fracture of the hand due to hitting the wall and bites of the hand |
| 5 The patient wanted to kiss the dog on his nose. The dog did not agree and bit the patient in the face. | Multiple bite wounds in the face of the patient, needed suturing       |
| 6 The patient slipped over the urine of the dog which he was babysitting. | Contusion of the lower back                                             |
| 7 The patient was cycling with the reins of the horse in her hand. The horse decided he wanted to eat some grass and suddenly stopped walking. Patient fell off the bicycle. | Fracture of the tibia and fibula needing open reduction internal fixation. |
| 8 A girl was horseback-riding, her mother was walking along her with two leashed pitbulls. One of the dogs came off and attacked the horse. The patient on the back of the horse was bitten by the dog and thrown off by the horse. The mother fell down. | The girl on the horse had a contusion of the elbow and bite wounds in the arm, needed suturing. Mother had multiple excoriations all over her body. |
| 9 Patient stumbled while he was feeding his neighbor's fishes. | Fracture of the humeral shaft, conservative treatment. |
| 10 Patient was walking a Danish dog on the leash. The dog started the run, the patient could not hold him and fell down. | Reduction of a dislocated distal radial fracture. |
spokes of his wheel and the patient was launched from his bike. The patient suffered a luxation of the acromio-clavicular joint, the dog died at the scene. The most remarkable examples of animal related injuries in the emergency department are listed in Table 3.

Discussion

2.8% Of the patients visited the ED because of animal related injury. This incidence is probably an undervaluation of the real number of animal related injuries. This retrospective study was conducted in the Spaarne Gasthuis, a hospital in a mostly urbanized area. The hospital services two medium sized city's surrounded by some small villages, with a population of approximately 450.000 inhabitants [10]. There are nearby areas with agriculture purpose, however there are not many areas used for cattle breeding, with a livestock of the area of approximately 400.000 animals [11]. Therefore we believe our data are an undervaluation of the real amount of animal related injuries. In rural areas more cattle related injuries can be expected. This has also been described in literature and these injuries can be expected to be more severe [12,13].

Since the medical charts of the patients were retrospectively analyzed there could be an underestimation of the number of animal related injuries. Perhaps some charts do not mention the animal related cause of the fall of a patient or the origin of the wound. Also, there could be an underestimation of minor and major animal related injuries. In the Netherlands, many patients suffering minor injuries are treated by a general practitioner, and are not admitted to the ED at all. Also major trauma patients are referred directly to a level-1 trauma center. Therefore we believe the incidence of animal related injuries is even higher than showed in this study.

When looking at the characteristics of the patients included in this study, most of the injuries concerned female patients. This is in contrast to the current literature, where males and children mostly suffered from injuries due to animals [9]. However, these studies concerned bite wounds only and we analyzed all animal related injuries. This study includes horse related injuries. In the Netherlands, horseback riding is a popular sport mostly performed by females; this fact could cause this difference in this study [14]. In 225 out of 245 horse related injuries the patient was female (91.8%), only 20 male patients were involved in horse related injuries. Strikingly, in almost half of the male patients the sustained mechanism of injury consisted of biting or scratching incidents, which was much higher than the percentage of biting or scratching injuries in females (16.1%). One could only hypothesize about if this is caused by a possible higher animal aggression towards males, or by the fact that males may take more risk in dangerous situations [15].

Animal related injuries in 2015 have been registered in the Dutch trauma information system (Letsel Informatie Systeem 2015), including 13 emergency departments. 2600 Traumas were reported with a mean of 200 injuries per emergency department. An estimated number of 23.800 animal related injuries have occurred in 2015 when extrapolating to the whole country. A fall due to an animal caused 55% of the injuries, most of these falls were caused by horses and dogs, 42% respectively 38% [16].

In this study, 516 medical charts of animal related injury in our hospital were analyzed. The incidence of animal related injury in our hospital is much higher, comparing to the trauma information system. This discrepancy could be due to the type of trauma which has been included and analyzed. In this study all animal related injuries were included, possibly not all types of injuries were included in the trauma information system. Also, all medical charts of patients admitted to the ED were retrospectively analyzed, to prevent an underestimation of the data.

This study provides insight in the potential dangers of pets. To investigate how these injuries can be prevented, further research is necessary. Better knowledge of this high incidence in the general population could lead to more awareness. More awareness, as caused by this article, should contribute to a decrease of the amount or severity of animal related injuries in the ED.

Conclusions

This study showed an incidence of animal related injuries of 2.8%, most of them caused by horses and dogs. This incidence is probably an underestimation of the real number of animal related injuries. The injuries have a noteworthy origin and might have severe physical injury as result. Awareness in the general population on this potential hazard could reduce the amount and the severity of animal related injuries.

Abbreviations

USA United States of America
ED Emergency departments
IQR Inter quartile range

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Conflict of interest

None.
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The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional guides on the care and use of laboratory animals. We confirm that there are no known conflicts of interest associated with the publication and there has not been financial support for this work. We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfy the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us.

Author contributions

Eva A.K. van Delft: writing article, data collection, data analysis.
Irene Thomassen: data collection, co-author, revising article.
A.M. (Marthe) Schreuder: data collection, co-author, revising article.
Nico L. Sosef: supervision of study, final revising of article.

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