Perforating Cervical, Thoracic, and Abdominal Wounds

Marije Risselada, DVM, PhD

KEYWORDS

• Body wall trauma • Body wall reconstruction • Bite wounds • Gunshot wounds

KEY POINTS

- Penetrating injuries can be associated with extensive tissue disruption and/or visceral damage.
- Bite wounds and vehicular traumas are associated with large body wall defects and less internal organ damage.
- Gunshot and impalement wounds are associated with small body wall wounds and major internal organ damage.

INTRODUCTION

Perforating wounds can be defined as any wound extending from the outside of a cavity or lumen to the inside. They can be caused by bite wounds, gunshot wounds, vehicular trauma, or other causes, such as impalement.[1–16] Most of these injuries resulting in body wall hernias are caused by bite wounds, as reported by Shaw and colleagues[7] in a retrospective series on 36 cases (26 dogs, 10 cats). Of the 26 dogs included, 14 had bite wounds, 10 had vehicular trauma, 1 was kicked by a horse, and 1 had unknown trauma.

Penetrating injuries are considered to be a serious presenting complaint regardless of the cause. A high number of surgical interventions and reconstructive procedures have been reported in the literature to be necessary.[2,14] The degree of skin damage in these cases does not give a good indication of the underlying tissue damage.[1,2,17] Radiographic evaluation of the involved body area should be included in the work-up of these patients to assess the extent of the injuries.[2,14] In most patients with penetrating injuries, severe damage to the body wall and/or internal organs is present.[1–5,18] Surgical exploration to assess the body wall and internal organs along with debridement of the underlying tissues is recommended.[4–7]

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Department of Veterinary Clinical Sciences, College of Veterinary Medicine, Purdue University, Lynn Hall, 625 Harrison Street, West Lafayette, IN 47907, USA
E-mail address: marije_risselada@ncsu.edu

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BITE WOUNDS

Bite wounds most commonly occur in small dogs. In a study of 196 bite wounds, the investigators found that small dogs (≤10 kg body weight [BW]) were the most common victims (61% of dogs of the study population compared with a hospital distribution of 34%).[6] This same finding is reflected in several other studies: in a study on thoracic bite wounds, all dogs except 1 weighed less than 8 kg.[1] In a study investigating traumatic body wall herniations, bitten dogs weighed significantly less than the other included dogs (6.7 kg vs 24.3 kg BW),[7] whereas other retrospective articles reported a mean BW of bitten dogs of 5.2 kg,[2] and a median BW of 7 kg.[14]

A breed predilection for bite wounds also has been reported: The largest case series (185 dogs) found a significantly higher number of cross breeds (37%), pinschers (27%) and terriers (5%) compared with the hospital population.[6] In the article by Scheepens and colleagues,[2] a high incidence of Yorkshire terriers (27%), Jack Russell terriers (20%) and Maltese (22%) was described, whereas a different article reported a significantly higher number of Jack Russell terriers and dachshunds in the bite wound group (33.3% and 25.0% respectively).[14]

In addition, a significantly higher proportion of males than females has been reported by Shamir and colleagues,[6] and most males were intact, leading the investigators to suspect that the male predominance was most likely to be related to the influence of sex hormones. A similar finding was described in other articles.[2,14]

In the largest retrospective study[6] (185 dogs and 11 cats), the most commonly affected areas were the thorax (64 dogs; 34.5%) and the neck (57 dogs; 31%).[6] The combination of thorax and abdomen was seen in 17 out of 185 dogs (9%). This same finding is reflected in other case series, in which the most commonly area affected was the thorax and chest wall.[1,14] The thoracic cavity was involved in 6 cases (50.0%), the abdominal cavity in 2 cases (16.6%), both cavities in 2 cases (16.6%), and the trachea in 2 cases (16.6%).[14]

Radiographically, subcutaneous emphysema, effusion, rib separation, rib fractures, and pneumothorax/pneumomediastinum/pneumoperitoneum are the most commonly reported findings. Rib fractures, either single or multiple, were diagnosed in 8 patients (8 out of 12). Pneumothorax, pneumomediastinum or pneumoperitoneum, depending on the area, was present in 11 patients (11 out of 12). Effusion was noticed in 7 patients (7 out of 12). Subcutaneous emphysema was present in 11 patients (11 out of 12).[14] Two abdominal muscle disruptions were evident radiographically with organ displacement in 1 case; no intercostal muscle disruptions were suspected or seen radiographically. This finding is in contrast with previous studies that found high incidences of significant additional injuries in 75% of patients (n = 12)[19] or in 6 out of 14 patients (42%).[7]

In one study, focusing exclusively on cervical bite wounds (55 animals [38 dogs/17 cats], 56 cervical bite wounds), 31 were managed with nonsurgical wound management, 13 with only local surgery, and 10 out of 55 with a full surgical cervical exploration. Six of these 55 cases, 3 dogs and 3 cats, had airway injury (3 trachea, 3 larynx).[15] In a series of 12 bite wounds, 2 involved the cervical area: 1 required tracheal repair, whereas the other required tracheal resection and anastomosis.[14]

GUNSHOT WOUNDS

Another cause of penetrating injuries are gunshot wounds.[8,10] Patients with gunshot wounds were 0.8% of all animals examined on a yearly basis over a 5-year period in 1 hospital.[12] In human medicine, surgical exploration after penetrating abdominal gunshot wounds is considered mandatory because of the high incidence of internal organ injury.[20] This guideline has also been used in veterinary medicine.[8,21] Animals