

VULNUS LACERATUM TREATMENT IN A LOCAL DOG: A CASE REPORT**Laporan Kasus: Penanganan *Vulnus Laceratum* pada Seekor Anjing Lokal****Dosmonytha Br Keliat^{1*}, I Wayan Wirata², I Gusti Agung Gde Putra Pemayun³**¹Veterinary Medicine Profession Program Student, Faculty of Veterinary Medicine, Universitas Udayana, Jl. PB. Sudirman, Denpasar, Bali, Indonesia, 80234²Veterinary Surgery Laboratory, Faculty of Veterinary Medicine, Universitas Udayana, Jl. PB. Sudirman, Denpasar, Bali, Indonesia³Veterinary Surgery Laboratory, Faculty of Veterinary Medicine, Universitas Udayana, Jl. PB. Sudirman, Denpasar, Bali, Indonesia

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Vulnus laceratum is a lacerated wound with an irregular shape caused by either sharp or blunt objects that penetrate the skin or underlying muscle. A three-year-old white dog named Snowi, weighing 24 kg, presented with an open wound near the base of the penis, which had become infected after repeated scratching over the past three weeks. Based on the history and observed clinical signs, the dog was diagnosed with *vulnus laceratum* at the base of the penis, with a favorable prognosis (*fausta*). Surgical management was performed according to standard wound care principles, including wound cleansing, removal of necrotic or damaged tissue (debridement), and wound closure using sutures. Postoperative treatment included administration of cefotaxime at a dose of 10 mg/kg, cefixime twice daily for seven days, and topical application of iodine to the sutured wound. By day nine, the wound had dried and the sutures were removed. The treatment in this case proved effective, as complete healing was achieved by the ninth day. The owner is advised to provide better care both during the postoperative period and afterward to prevent recurrence of similar lacerated wounds.

Keyword: *vulnus*, *laceratum*, wound management principles**Abstrak**

Vulnus laceratum adalah luka robek yang berbentuk tidak beraturan akibat terkena benda tajam atau tumpul yang menembus kulit atau otot. Anjing bernama snowi berumur 3 tahun dengan berat badan 24 berwarna putih. Anjing ini memiliki luka terbuka disamping pangkal penis yang sudah mengalami infeksi akibat garukan sejak 3 minggu yang lalu. Berdasarkan anamnesis dan tanda klinis yang tampak, anjing didiagnosis *vulnus laceratum* pada pangkal penis dengan prognosis Fausta. Penanganan operasi yang dilakukan berdasarkan prinsip luka yaitu pembersihan luka (*cleansing*), kemudian pengangkatan jaringan yang mati atau rusak (*debridement*), dan penutupan luka dengan jahitan (*suturing*). Perawatan pascaoperasi

dilakukan dengan pemberian antibiotik *cefotaxime* 10 mg/kg, pemberian antibiotik *cefixime* 2 kali sehari selama tujuh hari dan pemberian iodine pada luka jahitan. Pada hari kesembilan luka jahitan sudah kering dan jahitan sudah bisa dilepas. Pengobatan yang dilakukan pada kasus ini cukup efektif sehingga pada hari ke-9 luka menyatu dengan sempurna. Owner perlu lebih memperhatikan peliharaannya baik pasca operasi maupun tidak, supaya tidak terjadi *vulnus laceratum* kembali.

Kata kunci: *vulnus*, *laceratum*, prinsip manajemen luka

INTRODUCTION

Dogs are among the animals commonly kept as pets. Their intelligence, loyalty, and ability to communicate with their owners are the main reasons they are classified as companion animals (Fitriani., 2007). Human affection toward dogs directly influences how they are managed and cared for. Health status is an important aspect that receives considerable attention. However, dogs are still susceptible to various diseases, both infectious and non-infectious.

In their daily lives, animals may experience trauma caused by exposure to heat, blunt objects, or sharp objects, which can result in wounds. A wound, or *vulnus*, is defined as the loss or damage of part of body tissue components. When a wound occurs, several effects may arise, including partial or complete loss of organ function, sympathetic stress response, bleeding and blood clotting, bacterial contamination, and cell death (Kaplan & Hentz., 1992). Wounds can be classified based on their cause and characteristics. Based on etiology, wounds include *vulnus contusum* (contusion), *vulnus abratio* (abrasion), *vulnus laceratum* (laceration), *vulnus punctum* (puncture), *vulnus sclopetorum* (gunshot wound), *vulnus morsum* (bite wound), and *vulnus incisivum* (incised wound) (Lazarus *et al.*, 1994). One type of wound commonly found in dogs is *vulnus laceratum* or laceration (Chrisnanta dan Arni, 2018). *Vulnus laceratum* is characterized by an irregular wound caused by sharp or blunt objects that penetrate the skin or muscle (Amanda, 2019).

If not treated promptly, *vulnus laceratum* can lead to infection. If left untreated, the open wound may predispose to myiasis and can become life-threatening, making immediate treatment necessary. Management of *vulnus laceratum* in dogs involves three main principles of wound care: wound cleansing, removal of necrotic or damaged tissue (debridement), and wound closure using sutures (suturing). The purpose of this report is to describe the management and postoperative care of a *vulnus laceratum* case in a local dog.

RESEARCH METHODS

History and Signalment

The case involved a local dog named Snowi, male, three years old, with a body weight of 24 kg. The dog had a white coat. According to the owner, an open wound was observed at the base of the penis, which had been present for three weeks before treatment on Thursday, October 3, 2024. The dog was fed dry food and boiled chicken, with water provided *ad libitum*. The dog had previously been vaccinated.

Physical Examination and Clinical Signs

The clinical parameters of the dog were as follows: heart rate 100 beats per minute, pulse rate 105 beats per minute, respiratory rate 92 breaths per minute, capillary refill time (CRT) less than 2 seconds, and body temperature 38.4°C. Oral mucous membranes appeared pale. No abnormalities were detected during cardiovascular and respiratory examinations. Skin examination revealed two lacerated wounds located near the base of the penis.

Supporting Examination

A complete blood count was performed by collecting 2 mL of blood from the cephalic vein and storing it in a tube containing ethylenediaminetetraacetic acid (EDTA) to prevent clotting. The blood sample was analyzed using an automatic hematology analyzer at the Veterinary Teaching Hospital, Universitas Udayana. Hematological examination was conducted one day prior to surgery and indicated that the dog was anemic. The results are presented in Table 1. The complete blood count also showed lymphocytosis.

Diagnosis and Prognosis

The diagnosis was established based on the history, physical examination, clinical signs, and routine hematological findings. The dog was diagnosed with *vulnus laceratum* and anemia. In cases of *vulnus laceratum*, prognosis depends on the severity of the lesion. Based on the examinations performed, the prognosis in this case was considered *fausta*, as surgical wound closure was still feasible.

Preoperative Procedure

Preoperative preparation included setting up the operating room and preparing all surgical instruments. The patient was fasted for 12 hours prior to surgery. The surgical site was prepared by shaving the hair to avoid interference during the procedure. Premedication was administered using atropine sulfate (Atropine Sulfate[®], Ethica Industri Farmasi, Cikarang, Indonesia) at a dose of 0.02 mg/kg body weight via subcutaneous injection. Ten minutes later, a combination of xylazine (Xyla[®], Tekad Mandiri Citra, Bandung, Indonesia) at 2 mg/kg body weight and ketamine (Ketalar[®], Pfizer, Depok, Indonesia) at 10 mg/kg body weight was administered intramuscularly.

Surgery

Once the dog was adequately anesthetized, it was positioned in lateral recumbency on the operating table. After full anesthesia was achieved, surgical management of the wound was performed according to standard wound care principles, including cleansing, debridement, and suturing (Abdel-Khalek, 2019).

The first step involved wound cleansing using 3% hydrogen peroxide (H₂O₂) (Figure 2a). This was followed by removal of necrotic or damaged tissue (debridement) to promote proper wound healing (Figure 2b). The next step was wound closure (suturing), using absorbable chromic catgut 3-0 (OneMed, Sidoarjo, Indonesia) for the subcutaneous layer with a subcuticular suture pattern (Figure 2c), and silk 3-0 for skin closure of the other wound (Figure 2d). An iodine antiseptic was applied to accelerate wound healing. The wound was then covered with sterile gauze for three days, and an Elizabethan collar was placed to prevent the dog from scratching the wound and disrupting the sutures.

Postoperative Care

Postoperative management included administration of antibiotics to prevent infection during the healing process. Cefotaxime was administered intravenously at a dose of 10 mg/kg body weight immediately after surgery. This was followed by oral cefixime, given twice daily at a dose of one 100 mg capsule for seven consecutive days. Topical bacitracin 250 IU (Enbatic[®], Erela, Semarang, Indonesia) was also applied for external wound care.

RESULTS AND DISCUSSION

Results

On the first day after surgery, the dog appeared weak. The sutured wound was still moist, with swelling, erythema, and decreased appetite. On the second and third days, appetite began to

improve, although the wound remained moist. By days 4, 5, and 6, the sutures had started to dry, and the dog resumed normal eating behavior. On days 7 and 8, the wound was dry and showed signs of proper union. By day 9, complete wound healing had been achieved. The postoperative clinical observations over seven days are presented in Table 2.

Discussion

Based on the history and physical examination, the dog was diagnosed with *vulnus laceratum* located lateral to the base of the penis, caused by repeated scratching due to heavy tick infestation. According to Primadina *et al.* (2019), a wound is defined as a disruption in the continuity of anatomical tissue structures, ranging from superficial layers such as the skin epithelium to deeper tissues including subcutaneous tissue, fat, muscle, and bone. The wound in this case was classified as stage III *vulnus laceratum*, as the laceration was not severe and involved damage limited to the skin and subcutaneous tissue. Therefore, surgical management was indicated due to the depth of the wound. Open wounds often require days, weeks, or even months of care to achieve complete closure without complications (Mickelson *et al.*, 2016).

The surgical procedure for *vulnus laceratum* was performed based on three main wound management principles. The first step was wound cleansing using 3% hydrogen peroxide (H₂O₂). Hydrogen peroxide is an inorganic chemical compound with strong oxidizing properties that acts as a catalyst in various physiological processes and can reduce anaerobic bacterial infection (Umah dan Arif., 2012). This was followed by removal of necrotic or damaged tissue to create a fresh wound surface and promote proper healing (debridement). The final step involved wound closure (suturing), using chromic catgut 3-0 (absorbable) for the subcutaneous layer with a subcuticular pattern, and silk 3-0 for the other wound using a simple interrupted pattern.

Suturing was performed to limit the wound's exposure to the external environment and to appose the wound edges, thereby preventing myiasis and secondary infection while accelerating the healing process. Postoperatively, cefotaxime was administered intravenously. Cefotaxime is a third-generation cephalosporin antibiotic with good affinity against Gram-positive bacteria and broader coverage against Gram-negative bacteria, and it is also active against *Streptococcus pneumoniae*. This antibiotic is commonly used to treat severe infections caused by organisms resistant to many other antibiotics (Zhakharian *et al.*, 2018).

Cefotaxime acts by inhibiting bacterial cell wall synthesis (Plumb., 2008). Its use is effective in reducing bacterial growth and preventing infectious complications and is generally administered for up to 24 hours postoperatively. This was followed by oral administration of cefixime for seven days. Cefixime is also a third-generation cephalosporin that works by inhibiting bacterial cell wall synthesis (Plumb., 2008). In addition, topical bacitracin and iodine antiseptic were applied to promote wound drying at the surgical site. The use of topical antibiotics can help inhibit bacterial infection from external sources (Whaley., 2004).

Hematological examination showed that the dog was anemic. Anemia is not a disease but a clinical condition resulting from an underlying process, characterized by a decrease in erythrocyte count, hemoglobin level, or both in circulation. In this case, the erythrocyte count was $2.87 \times 10^6/\mu\text{L}$ and the hemoglobin level was 7.4 g/dL. Based on its etiology, the anemia was classified as macrocytic normochromic anemia associated with parasitic infestation, as numerous ticks (*Rhipicephalus sanguineus*) were found. This type of anemia is often associated with nutritional deficiencies, including vitamin B12, riboflavin, and vitamin C.

Management of anemia in this case included administration of Sangobion once daily following surgery. Sangobion was given as supportive therapy to improve the animal's condition. It is a

combination of iron, folic acid, vitamin B6, vitamin B12, and vitamin C, all of which play important roles in red blood cell formation.

After surgery, the dog was kept in a clean and dry environment, confined, fitted with an Elizabethan collar, and closely monitored for wound healing. Wound healing is a dynamic process that begins at the onset of injury and continues until the wound is repaired and replaced with new tissue (Ansori., 2015).

On days two to three, the sutured wound still appeared moist and the skin had not fully united, although the appetite had begun to improve. On days four to six postoperatively, the sutures began to dry (Figure 3b), and appetite was good. On days seven and eight, the wound edges had united and continued to dry (Figure 3c). The dog's overall condition was good, and it was able to resume normal activity. By day nine, complete wound healing had been achieved (Figure 3d).

CONCLUSION AND SUGGESTIONS

Conclusion

Based on the history, physical examination, and clinical findings, the dog was diagnosed with *vulnus laceratum* at the base of the penis. Management involved surgical intervention based on three main wound care principles: wound cleansing, debridement, and suturing. Postoperative treatment included administration of cefotaxime (IM), followed by oral cefixime for seven consecutive days, along with topical application of Enbatic powder and iodine. By day eight postoperatively, the wound had united and begun to dry, accompanied by improved appetite.

Suggestions

Pet owners are advised to provide close attention to their animals. Special care should be given during the postoperative period to support faster wound healing. To prevent severe *vulnus laceratum* in dogs, owners should maintain proper environmental hygiene and monitor their animals' condition closely. If trauma occurs, prompt medical intervention is necessary to prevent complications such as myiasis or more severe secondary infections.

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Figures



Figure 1. Wound at the base of the penis

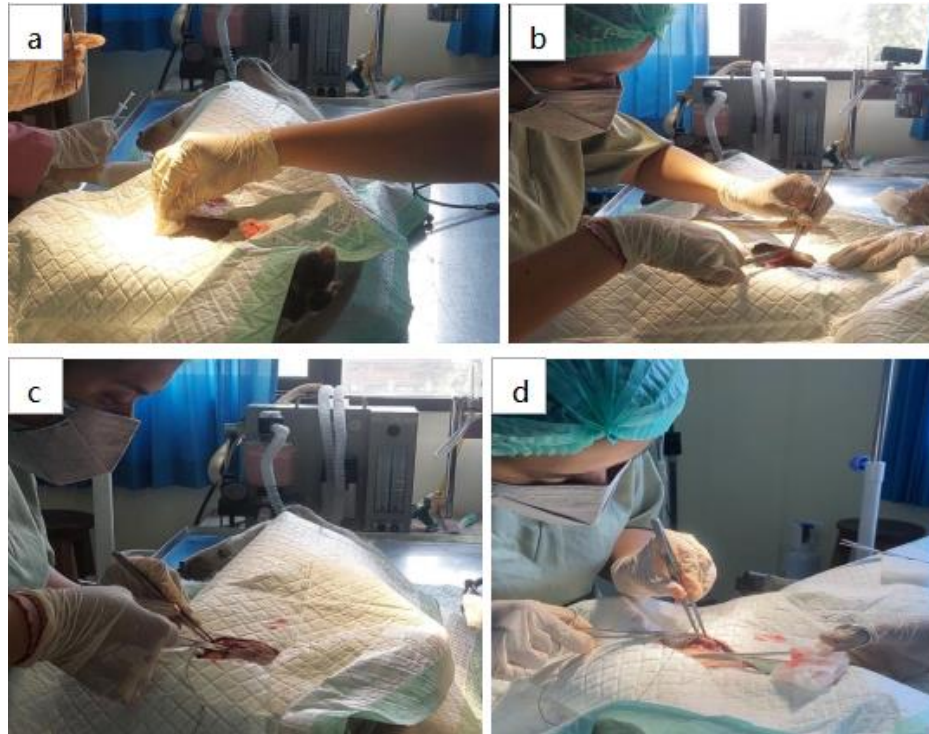


Figure 2. a. Cleansing, b. Debridement, c. Subcuticular suturing, d. Simple interrupted suturing

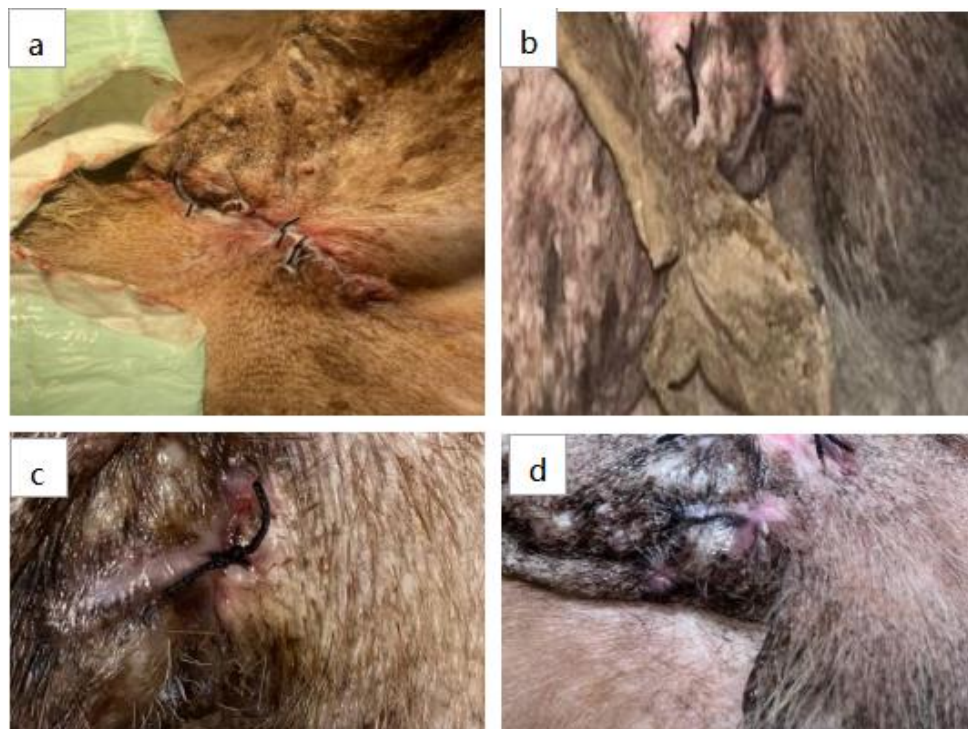


Figure 3. a. Wound on day 1 postoperatively, b. Wound on days 4 to 6 postoperatively, c. Wound on days 7 and 8 postoperatively, d. Wound on day 9 showing complete healing

Tables

Table 1. Hematological examination results of the dog with a lacerated wound near the base of the penis over one month

Parameter	Results	Reference range
WBC 10 ³ /μL	9,43	6-17
Lymphocytes %	78,6**	12-30
RBC 10 ⁶ /μL	2,87*	5,5-8,5
Hemoglobin g/dL	7,4*	11-19
MCHC g/dL	32,4	30-38
MCH pg	26	20-25
MCV fL	80,1**	62-72
HCT %	23*	39-56
PLT 10 ³ /μL	149	117-460

Note: Higher (**), Lower (*) than reference range. Abbreviations: WBC=White blood cell; RBC=Red blood cell; MCHC=Mean Corpuscular Hemoglobin Concentration; MCH=Mean Corpuscular Hemoglobin; MCV=Mean Corpuscular Volume; HCT=Hematocrit; PLT=Platelet.

Table 2. Postoperative observation, therapy, and results

Day observation	Therapy	Results
1	Administration of cefotaxime (IM) at 4.8 mg/kg, Enbatic powder, and iodine.	The sutured wound was still moist, swollen, and erythematous. The dog appeared weak, with decreased appetite and water intake, and slightly reduced activity.
2 and 3	Administration of cefixime (PO), iodine, and bacitracin (Enbatic powder).	The sutured wound remained moist, appetite began to improve, and the patient showed signs of itching at the surgical site.
4,5, and 6	Antibiotic cefixime (PO), iodine dan bacitracin (enbatic powder).	The sutured wound began to dry, appetite improved, and urination and defecation were normal.
7 and 8	Bacitracin and iodine	The wound began to unite and dry.
9	Bacitracin and iodine	The wound achieved complete healing.