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## ***Staphylococcus aureus* Infected Subcutaneous Abscess In Guinea Pig: A Case Study.**

**N Mohana\*, R Narasimha Raghavan, D Sivaraman, G Vignesh, D Saravanan, and R Selvaraj.**

Centre for Laboratory Animal Technology and Research, Sathyabama University, Jeppiar nagar, Chennai - 600 119, Tamil Nadu, India.

### **ABSTRACT**

Subcutaneous abscess is a very common clinical condition faced by guinea pigs, which is caused by the number of infective bacteria. Eight months old female guinea pig was presented with a firm circumscribed subcutaneous swelling on the left ventral aspect of the neck region. On physical examination the swelling was suggestive of abscess. Hematological examination revealed the presence of leukocytosis and neutrophilia. While the abscess was restricted to the ventral subcutaneous region, neither bony deformities nor dental involvement was observed on radiology. In the anesthetized animal, the abscess was lanced and thick, creamy yellowish green pus was removed. Pus collected from the abscess was subjected to microbial examination and result showed the growth of *Staphylococcus aureus*. Post operatively the animal was treated with antibiotics and analgesics. The excised wound was completely healed on the 7th day. In guinea pig the abscess was treated surgically and the animal recovered uneventfully.

**Keywords:** Guinea pig, surgical management, subcutaneous abscess, *Staphylococcus aureus*

**\*Corresponding author**

## INTRODUCTION

An abscess is a localized cavity containing purulent material, as a resultant of immune defensive mechanism of the body. In guinea pigs the subcutaneous abscess is very common, etiology being associated to either bite wounds of group housed adult animals due to fighting and or trauma due to sharp edges in cages. Eventually, these may become infected and form single or multiple abscesses. A wide range of bacteria has been isolated from these abscesses, which include *Streptococci*, *Staphylococci*, *Corynebacteria*, *Pasteurella*, *Pseudomonas* and other environmental contaminants [1]. Especially in guinea pigs, the skin infections are widely caused by *Staphylococcus aureus*, establishing the purulent abscess formation in the skin and feet [2] and in earlier studies the similar organism was isolated from subcutaneous abscesses [3]. Invasion of organism into the tissue, will multiply and form a staphylococcal abscess community (SAC) in the mid of the lesion, leading to degeneration and necrosis of cells [4]. These abscesses are commonly formed on the skin of ventral neck region [5]. Since, the guinea pig species is very sensitive for stressful handling and surgical procedures, the successful and proper treatment is required in order to save the animal. This report describes the management of subcutaneous abscess, and their long term follow-up.

## MATERIALS AND METHODS

An eight month old female guinea pig showed firm, subcutaneous swelling on the left ventral neck region. On physical examination the swelling was very hard and painful (Fig. 1A), the appearance of hair coat was dull with reduced body weight. It had a history of anorexia, fighting behavior among cage mates. For the differential diagnosis of tumors, the fine needle aspiration cytology (FNAC) was done. To know the extent and nature of the mass and to determine any dental lesions, radiographs of the neck region (Lateral view) were performed with 20 mAs, 50 Kvp. Blood was collected by venipuncture of lateral saphenous vein and submitted for hematological analysis.

The animal was anesthetized with a cocktail of ketamine 45 mg/ kg b.wt and xylazine 10 mg /kg b.wt by intra peritoneal route. The area in and around the abscess was shaved and disinfected with disinfectant solution. The cruciate shaped incision was made with the most fluctuant point of the abscess. The abscess cavity was explored, thick, creamy yellowish green pus was drained out as much as possible by application of finger pressure (Fig. 1B). By using povidone iodine 10% solution diluted in normal saline (1:1), the cavity was flushed and irrigated well to remove the remaining purulent materials. The abscess cavity was packed with gauze dipped in povidone iodine solution [6].

Post operatively the vital signs were monitored. Meloxicam was administered at 0.2mg/kg b.wt QD intra muscularly for three days. Enrofloxacin was given for five days at 10mg/kg b.wt BID intra muscularly. The gauze was changed daily up to three days and the wound treated as an open wound. The 10 % povidone iodine ointment applied daily over the wound surface. After the surgical incision the drained pus was smeared on a glass slide, stained with Gram's stain. The pus was cultured in nutrient and blood agar, incubated at 37°C for 24 hours. The bacterial colonies were stained with Gram's stain. On the second day the growths were sub-cultured on mannitol salt agar and series of biochemical tests were performed.

## RESULTS

The growth was measured about 3 cm diameter. It was very much hard to palpate. The FNAC revealed thick, creamy pus. On radiograph, the mass was confined to the subcutaneous region of the neck, no bony lesion on skull bones and tooth deformities were observed (Fig. 2A). The animal showed transient tachycardia due to surgical manipulation and lasted up to 15 mins. Other vital signs were normal. Second day the swelling was subsided substantially, but a residual abscess was seen on the radiograph. (Fig. 2B). The remaining purulent materials were drained out through the existing opening. While on the 4<sup>th</sup> day the wound appeared partially closed (Fig. 1C), seventh day characterized by complete closure of the wound. (Fig. 1D&2C).

The Haematology showed neutrophilia and leucocytosis, other parameters were within the normal range. Degenerated neutrophils, macrophages, very few bacteria and necrotic tissues were noticed in pus stained with Gram's stain.



Figure 1A: Medium sized subcutaneous abscess on neck region  
 Figure 1B: After surgical incision and drainage, the explored abscess cavity  
 Figure 1C: Partially closed surgical wound  
 Figure 1D: Complete closure of surgical wound



Figure 2A: The mass confined to the subcutaneous region of the neck.  
 Figure 2B: Radiograph revealing residual purulent material in abscess cavity  
 Figure 2C: Radiograph showing the complete recovery of abscess

In nutrient agar, the growth was characterized as shiny, golden yellow colored, opaque, large circular convexly elevated colonies. In blood agar, large colonies were surrounded by a wide zone of haemolysis with yellowish pigmentation. The colonies stained with Gram's stain was presented with, grape like clusters of gram positive cocci. In mannitol salt agar, the growths were typically appeared as yellow colonies with yellow zones. Biochemically the bacteria showed positivity for Catalase and Coagulase tests, negativity for oxidase test. From all the above results, the causative organism was confirmed as *Staphylococcus aureus*.

### DISCUSSION

The *staphylococcus aureus* is most prevailing causative agent, in particular to skin and subcutaneous abscess formation in the rodents like a guinea pig. No significant pathological changes were observed on skull bones and teeth upon radiological examination of the animal. As the animal had previous history of rivalry among cage mates, the injury of animal bite with bacterial invasion paved the way for subcutaneous abscess formation. The same observation was reported previously [7,8]. The infection has usually been an airborne and

also by direct contact [9,10]. In order to prevent such infection, social isolation of affected animals and proper sterilization of feed, bedding and cages are highly essential.

The abscess should be treated as early as possible, due to possibilities of causing pressure on the vital blood vessels of the neck and the esophagus, which can be life threatening to the animal. The guinea pigs' neutrophils lack the enzyme myeloperoxidase, responsible for the liquid exudate formation and hence suppuration is almost always very thick and creamy [11]. Hence, surgical drains are not useful post operatively and can only lead to continued bacterial infection and poor drainage. Hematological changes were consistent with that of usual inflammatory pathology [12]. The morphology of organisms in gram's stained smear, culture characteristics and biochemical parameters were similar to the growth characteristics of *Staphylococcus aureus* seen in earlier results [13].

In conclusion, abscess in the cutaneous region was treated by appropriate surgical management with suitable topical antiseptic therapy and systemic antibiotic, analgesics, further the animal was recovered completely.

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