



# Subcutaneous Emphysema in a Psittacine Bird: A Case Report

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

**Case Report**

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## **ABSTRACT**

**Background and Aim:** Subcutaneous emphysema is an uncommon disorder that involves trapped air under the skin. This most frequently happens in the skin covering the chest, neck, and abdomen. On occasion, though, it can be brought on by a serious accident, an injury, or an infection. It is a condition often causing mild symptoms, but sometimes it can be dangerous and even life-threatening.

**Case Representation:** A 17-month-old parrot had been admitted to the hospital with the symptoms of a swollen abdomen, anorexia, and coughing. Based on the clinical history and physical examination, the diagnosis was made. The problem was treated with a single needle puncture and supportive treatment. On that day, the bird was released, and until it was extricated, there was continuous contact with the owners.

**Discussion:** Subcutaneous emphysema, a relatively uncommon occurrence in Bangladesh, can be caused by a number of factors, including trauma, infection, and fractures. It can be confirmed by radiography or by removing the gas from the enlarged area. This condition can be treated with paracentesis and supportive care, with or without the use of antibiotics.

**Conclusion:** The study's main goal is an exploration of subcutaneous emphysema that was corrected via paracentesis with supportive treatment.

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## 1. INTRODUCTION

The collection of pockets of air under the skin is sometimes a spectacular event, which is why it is discovered infrequently. Gas under the skin is referred to as "subcutaneous emphysema" and is also known as "windpuff" [1]. Air sacs can burst for a variety of reasons, which can lead to subcutaneous emphysema. The skin enlarges around the location and the subcutaneous space becomes filled with air when the afflicted air sacs leak [2]. The pharyngeal-tracheal, cervico-cephalic, and pulmonary air sac systems are the three main divisions of the avian air sac system [3]. Most frequently, the cervico-cephalic and pulmonary (abdominal or caudal thoracic) air sacs are affected. The intraorbital sinus is the only relationship that exists between the cervico-cephalic air sacs and the pulmonary air sacs or the lungs [4]. Air can build up beneath the skin of aquatic or flying birds due to fractures of pneumatic bones including the humerus, coracoid, and sternum, claimed by [5]. Subcutaneous emphysema is seen as a pathogenic sign in some bird species (such as parrots and hawks), yet it is a normal physiological condition in others (such as pelicans) [6]. Gas under the skin that has built up is uncomfortable and weakens the bird's immune system. The accumulated air then passes down the neck, resulting in weight increase and skin pallor [7]. Additionally, when certain anaerobic bacteria are connected to gangrenous inflammation, an accumulation of gas under the skin may result. Subcutaneous emphysema in this ailment is typically accompanied by illness and a loss of function in the affected region. Red, green, or black discoloration indicative of infection might be seen in sensitive tissue [8]. An infestation of *Columbicola columbae* led to subcutaneous emphysema in a domestic fantail pigeon [9]. Injury, inflammation of the lungs or air sacs brought on by pathogenic agents, and dietary deficits are common causes of subcutaneous emphysema in birds. Subcutaneous emphysema is usually not a life-threatening condition, but it can cause discomfort in birds and have unfavorable effects, including reduced activity, hunger, or immunological suppression. Subcutaneous emphysema may be life-threatening in severe cases [6,10]. It may take two to three weeks for the emphysema to spontaneously recover, although bacterial complications are a common concern. Sometimes subcutaneous emphysema is a

chronic or severe condition that needs more intensive care. A Teflon stent (TEFLON dermal stent; McAllister Technical Services, Coeur d'Alene, ID, USA) and a cervicocephalic-clavicular air sac shunt have both been recommended as treatments for cases that are more severe and/or persistent [11,12]. A small incision is made in the patient to introduce the Teflon stent into the subcutaneous area. Before inserting the stent, the four pairs of preplaced, nonabsorbable sutures should be put in place [6]. Using a sharp object to pierce the skin can also be used to treat afflicted birds [10,13]. Our main objective was to remove the gases from under the skin of the bird and improve its condition. Very few studies have been done on this case in the world and we are the first team to investigate this case in Bangladesh.

## 2. CASE PRESENTATION

On July 19th, 2022, a parrot called Mithu was presented by his owner to the Shahedul Alam Quadary Teaching Veterinary Hospital (SAQTVH), Chattogram Veterinary and Animal Sciences University, Chattogram, Bangladesh. Loss of appetite, coughing, and skin swelling was the owner's main concerns. A clinical examination indicated skin swelling under the left side of the abdomen (Fig. 1), a pale coloring on the skin of the abdomen, dehydration, coughing, and loss of appetite. There is a soft, ballooning, and without-pain sensation on gentle palpation. Based on the patient's medical history and clinical symptoms, a tentative diagnosis of subcutaneous emphysema was made. After paracentesis, when gas was removed from the swollen area, we confirmed it.

A careful observation indicated some alterations in the bird, which comprised gas accumulation beneath the skin, paleness of the skin, and frailty (Fig. 1). There is no indication of injury, eruption, wound in the skin, or breakdown of the structure that could create the entrance path of the gas. So, the condition was then assumed as subcutaneous emphysema without having any certain cause. The gases are eliminated by the paracentesis technique (Fig. 3). In this procedure, an aseptic fresh 18 G hypodermic needle was gently perforated into the skin (Fig. 2), then a 5 mL syringe was attached to the needle. This piercing was applied only in one place. And the required reduction in gas volume

was seen after using this piercing just once. Amino acid solution (Solution Aminovit plus vet<sup>®</sup>; 100ml Vial; Popular Pharmaceuticals Ltd., Bangladesh) was prescribed for the bird for 5 days of oral intake of 1mL mixed with 1L drinking water to provide vitamins, minerals, and amino acids. Additionally, the electrolyte powder (Pulv. Electromin<sup>®</sup>; 20gm packet; SQUARE Pharmaceuticals Ltd., Bangladesh) 2gm was administered orally with 1L of drinking water for 7 days to reduce the bird's frailty as it was under stress conditions. To maintain the balance of water and ions this was advised. Early detection of subcutaneous emphysema has a good prognosis, and the bird can resume normal activity in a week. After the therapy was given there were no difficulties and the owner was

satisfied with the treatment and outcome. Care should be taken while puncturing the skin to prevent the spread of harmful bacteria and injury to internal organs. That is why we had to wash the area with antiseptic (Solution Povisep<sup>®</sup>-10%; 30ml; Jayson Pharmaceuticals Ltd., Bangladesh) as needed after paracentesis. It acts as an antiseptic. The owner was advised to administer the drugs properly according to the prescription, maintain a comfortable place for the animal, feed it a normal diet, and inform if the swelling reoccurs. The parrot was fed by its owner on the first day and kept in seclusion; on the third day, it resumed self-feeding, and by the seventh day, it had recovered. The significance of emphysema and the promptness of management determines the prognosis.



**Fig. 1. Subcutaneous emphysema in abdomen**



**Fig. 2. Inserting a hypodermic needle into the swollen area of the parrot**



**Fig. 3. Application of paracentesis technique for releasing gas**

### **3. DISCUSSION**

Subcutaneous emphysema in psittacine birds is a very rare case in Bangladesh. In this case report, the actual etiology of the subcutaneous emphysema of the bird is unknown. Similarly, these researchers have reported their cases with unknown etiology [14,15,16]. But other researchers recognized that etiological causes of windpuff in birds have been trauma, air sac inflammation carried on by infection, and nutritional deficiencies [4,17]. We diagnosed subcutaneous emphysema based on swelling of the skin on the left side and confirmed it by paracentesis technique. Other researchers [10,18] also diagnosed subcutaneous emphysema based on these methods, and some researchers based on radiographic examination confirmed the diagnosis [3,12]. Following diagnosis, we removed gas using the paracentesis technique and administered supportive therapy. Other researchers who have employed the paracentesis technique concur with our approach [10,13,18]. We did not use any antibiotics to treat this condition in our study, which contradicts the findings of other authors who used the antibiotics oxytetracycline [10,18] or enrofloxacin [2]. Alternatively, streptomycin and penicillin [9]. We used an antiseptic solution as per the requirement to prevent microbial contamination, which is also contrary to those authors. This condition can be treated surgically by making an incision and placing a Teflon stent, which is contrary to the method we followed [2,6]. As supportive therapy, we used Amino acid solution and electrolyte powder for vitamins, minerals, and amino acid supplement and

rehydration of the bird. Vitamin B1 can be used as supportive therapy which agrees with our treatment [8], but in this case, other authors do not agree with us [2,10,15]. In this study, paracentesis and supportive therapy were used to successfully cure subcutaneous emphysema in psittacine.

### **4. CONCLUSION**

The clinical and therapeutic approach to subcutaneous emphysema in a psittacine bird is described in this research. There was swelling under the abdomen, and the cause of the emphysema was unknown. A sterile 18-gauge needle was used to puncture the swollen areas to remove the gas as part of the treatment. Instead of using antibiotics, we successfully treated the condition with supportive care.

### **CONSENT AND ETHICAL APPROVAL**

It is not applicable.

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### **COMPETING INTERESTS**

Authors have declared that no competing interests exist.

## REFERENCES

1. Riddle C. Developmental, Metabolic, and other noninfectious disorders. In B.W. Calnek, H.J. Barnes, C.W. Beard, L.R. McDougald and Y.M. Saif (Eds). Diseases of Poultry, 10th Edn. Iowa State University Press: Ames, IA. 1997;913-950.
2. Lee SY, Kim HJ, Kim JW. Deflation treatment for subcutaneous emphysema in a Goffin Cockatoo (*Cacatua goffini*). Journal of Veterinary Clinics. 2011;28(5): 519-21.
3. Hillyer E, Orosz S, Dorrestein G. Respiratory system. In: Avian Medicine and Surgery, Philadelphia: WB Saunders. 1997;387-411.
4. Tully TN, Harrison GJ. Pneumatology. In: Avian medicine: Principles and application, 2<sup>nd</sup> eds., Lake Worth, FL: Wingers Publishing. 2018;556-581.
5. Crespo R, Shivaprasad HL. Developmental, metabolic, and other noninfectious disorders. Diseases of poultry. 2013 Oct 4;1233-70.
6. Petevinos H. A method for resolving subcutaneous emphysema in a Griffon vulture chick (*Gyps fulvus*). Journal of Exotic Pet Medicine. 2006 Apr 1;15(2): 132-7.
7. Saif YM, Barnes HJ, Glisson JR, McDougald LR, Fadly AM, Swayne DE. Diseases of poultry, 11<sup>th</sup> edition. Iowa State Press. 2003;2121:1103-13.
8. Radan M, Rautenstein-Arasi N. Anaerobic subcutaneous emphysema of poultry. Nature. 1950 Sep;166(4219):442.
9. Sundaram AS, Rajkumar K, Arunkumar S, Gnanaraj PT. Subcutaneous emphysema in a domesticated fantail pigeon caused by *Columbicola columbae* infestation: A case report. Journal of Entomology and Zoology Studies. 2018;6(4):983-5.
10. Kamani J, Tijjani A, Yidawi JP, Gana AL, Egwu OK, Gusi AM. Subcutaneous emphysema (Windpuff) in a 13 weeks old pullet: case report. International Journal of Poultry Science. 2009;8(11): 1121-2.
11. Harris JM. Teflon dermal stent for the correction of subcutaneous emphysema. InProc Assoc Avian Vet. 1991 Sep 23; 20-21.
12. Levine B. Cervicocephalic-clavicular air sac shunts to correct cervicocephalic air sac emphysema. In Proc Assoc Avian Vet; 2005.
13. Devaraynam J, Naveen M. Subcutaneous emphysema in a pullet. Int. J. Agric. Sc. and Vet. Med. 2013;20013(1):35-6.
14. Choudhury D. A case report on subcutaneous emphysema in Vanaraja Chicken. International Journal of Applied Research. 2020;6(12):247-248.
15. Kaboudi K. A rare case of subcutaneous emphysema in a 28 weeks old rooster. International Journal of Veterinary Sciences and Animal Husbandry. 2019; 4(5):23-5.
16. Sankar P, Mohammed PS. Subcutaneous emphysema in a Deshi Chicken-A case report. International Journal for Agro Veterinary and Medical Sciences. 2015; 9(3):74-76.
17. Shaha M, Lima A, Das A, Miah G, Nath SK, Paul P, Kamal T, Sen AB, Miazi OF. Management and treatment procedure of windpuff caused by lice infestation in domestic pigeon: A case report. World Journal of Advanced Research and Reviews. 2021; 10(2):220-4.
18. Reddy BS, Sivajothi S. Management of lice infestation in dairy calves. RRJoVST. 2013;2(3):13-4.