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Clinical Report

Uncomplicated Generalized Subcutaneous Emphysema in a Dog

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Abstract

Case Description- A 3-year-old male mix breed dog was referred to the veterinary hospital for evaluation of extensive subcutaneous emphysema. The emphysema was initially confined to the thoracic region and then progressed symmetrically over the abdominal regions, even face and extremities. The animal had normal appetite and physical examination. Crackling sensation was detected on palpation of the swollen areas and emphysema causing closure of palpebral fissures but no respiratory distress and external wounds were noted. Endoscopy was carried out but no mucosal rupture was seen on the pharyngeal area, trachea, and esophagus. Thoracic radiographs showed diffuse subcutaneous emphysema, pneumomediastinum and left fifth and sixth rib's fracture, but there was no evidence of pneumothorax.

Treatment and Outcome-Strict cage rest was recommended. Alternate daily radiographs reveled that subcutaneous emphysema was completely resolved spontaneously after ten days.

Clinical Relevance-Generalized subcutaneous emphysema occurs when air leaks strongly via tracheobranchial tears or cervical and intrathoracic lesions .This phenomenon is a rare condition in dogs and routinely become complicated because sever accumulation of air cause side effects such as pleural rapture, pneumothorax and dyspenea in affected animals. Surprisingly no complication was seen after tracheobranchial lesion in this case and the dog heals spontaneously.

Key Words- Generalized Subcutaneous Emphysema, Pneumomediastinum, Dog.

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Case Description

A 3-year-old intact male mix breed dog was referred to the veterinary hospital for evaluation of extensive subcutaneous emphysema. The emphysema was noted by the owner after the dog accidentally hit with a big timber which falls on the dog's kennel and initially was confined to the thoracic region but then progressed symmetrically over the abdominal regions, even face and extremities. The animal had normal appetite and physical examination. Results of CBC and serum biochemical analysis were within normal range too. Crepitations were detected on palpation of the swollen areas and emphysema causing closure of palpebral fissures but no respiratory distress and external wounds were noted. Esophagogastroscopy and bronchoscopy was carried out using a 9mm diameter endoscope(Vet-Vu/Swiss) but no mucosal rupture was detected on endoscopy of the pharyngeal area, trachea, and esophagus. Thoracic radiographs showed diffuse subcutaneous emphysema, pneumomediastinum and left fifth and sixth ribs fracture, but there was no evidence of pneumothorax. Pneumoretroperitoneum was not observed in abdominal radiographs either.

Treatment and Outcome

Strict cage rest was recommended. Furthermore, reporting of respiratory distress occurrence was indicated to owner. Alternate daily radiographs were taken and improvability of the SC emphysema was confirmed. No analgesic drug was used due to good clinical status of animal. After ten days, subcutaneous emphysema was completely resolved spontaneously.

Discussion

Pneumomediastinum is the presence of free air or gas within the confines of the mediastinum. The mediastinum that considered incomplete in dogs is a potential space located centrally between the left and right pleural cavities and contains numerous vital structures including the heart, trachea, esophagus, great vessels, lymphatics, vagus nerves, and thymus. The mediastinum communicates cranially with the cervical fascial planes through the thoracic inlet and with the retroperitoneal space through the aortic hiatus.[1,2]

Pneumomediastinum can result from a variety of defects in the airways, lung, oropharynx, esophagus, retroperitoneal space or fascial planes of the neck. Pneumomediastinum can also result from blunt or penetrating wounds, infection with gas-forming organisms or iatrogenic injuries such as traumatic intubation, endotracheal tube cuff overinflation, positive-pressure ventilation, transtracheal wash procedures, esophageal dilatation, and jugular venipuncture.[1]

Generalized subcutaneous emphysema occurs when air leaks strongly via aortic hiatus and cervical facial planes synchronous. The common causes of subcutaneous emphysema are rib fractures, parenchymal lung wound and esophageal trauma.[1,3,4,5,6,7]

In chest trauma, aberrant extra-alveolar air starts with alveolar rupture and leakage of air into the pulmonary interstitium. This air subsequently tracks along the perivascular space to the mediastinum. Further extension along tissue planes leads to subcutaneous emphysema, pneumopericardium and pneumoperitoneum.[2] Subsequently the mediastinal pleura may rupture, causing pneumothorax.[1] Commonly, since the least resistance to expansion is offered by subcutaneous tissue, it leads to worsening that is not only disfiguring, uncomfortable and

alarming for the patient, but sometimes can be associated with airway compromise, respiratory failure and circulatory collapse secondary to decreased venous return resulting from compression of vena cava and azygous vein.[1,8,9,10]

Scarcely, some patients experienced the benign entity of traumatic pneumomediastinum without pneumothorax and other complication. This phenomenon is also common in the great majority of spontaneous pneumomediastinum cases. [9]

Mediastinal drainage by an emergency operation should always be a choice to a patient having a progressively worsening pneumomediastinum which might cause tachycardia, low blood pressure, and severe dyspnea due to compression of blood vessels and trachea. In the spite of that for the patients that are admitted to the hospital without these findings this caution is generally unwarranted and just close observation for detection of healing process is recommended.[11]

Multiple unstable rib fracture may require internal fixation but for fin traumatic pneumomediastinum with simple non- displaced rib fractures, conservatively treatment and cage rest are the best choices.[12,13]

Generalized subcutaneous emphysema is a rare condition in dogs and routinely after blunt trauma, only localized subcutaneous emphysema happens.[14]On the other hand, Sever accumulation of air in mediastinum commonly cause pleural rapture, pneumothorax and dyspenea in affected dogs [1,2]. Surprisingly no complication was seen in this case in the spite of sever air leaking from the traumatized bronchi and alveoli in to the mediastinum and subcutaneous spaces and the animal illustrates the benign entity of pneumomediastinum.

These findings indicate that in similar cases, strict cage rest and observation for respiratory distress occurrence along with daily radiograph taking must be done before aggressive intervention. Besides concurrent subcutaneous emphysema does not require needle aspiration unless the air volume is large enough to cause sever discomfort.[1]

Figure 1: Generalized subcutaneous emphysema

Figure 2: Normal appearance of animal after recovery

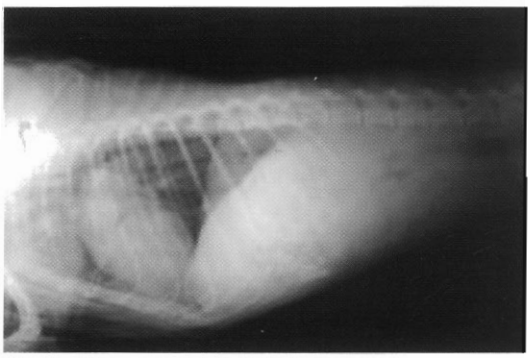

Figure 3: Lateral thoracic radiograph showing pneumomediastinum and subcutaneous (SC) emphysema (arrow). Mediastinal structures such as the esophagus, major branches of the aortic arch, and trachea are visualized, indicating pneumomediastinum.

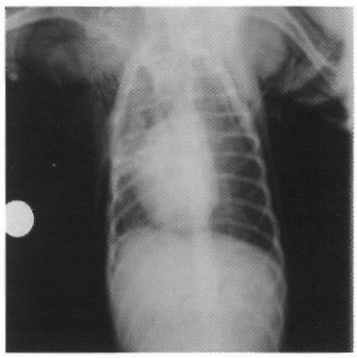

Figure 4: Ventrodorsal thoracic radiograph that shows pneumomediastinum. Diffuse subcutaneous emphysema and fifth and sixth rib's fracture.

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چکیده

وقوع آمفیزم زیر جلدی منتشر غیرپیچیده در یک قلاده سگ

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توصیف بیمار- یک قلاده سگ نر۳ ساله نژاد مخلوط جهت بررسی علت وقوع تورم سرتاسری زیرپوستی به درمانگاه دانشکده دامپزشکی ارجاع داده شد.این نورم ابتدا فقط در ناحیه سینه حیوان به چشم می خورد، اما به تدریج به شکل قرینه به صورت و اندامها هم کشیده شده بود.حیوان اشتها و معاینات بالینی طبیعی داشت. گرچه حالت جزجزی در معاینه پوست مناطق منورم ملامسه می شد و پلکها در اثر تورم حالت بسته پیدا کرده بودند اما هیچ گونه زخم منفذه و یا سختی تنفسی در حیوان وجود نداشت. در آندوسکوپی هیچ گونه پارگی مخاطی در نواحی حلق،مری و نای مشاهده نگردید. در رادیوگرافهای قفسه صدری،حضور آمفیزم منتشر زیر پوستی، پنوموندیاستینوم وشکستگی دنده های پنجم و ششم سمت چپ قابل مشاهده بود،اما پنوموتوراکس وجود نداشت.

درمان و نتیجه آن- ایجاد محدودیت حرکتی شدید برای حیوان توصیه گردید.رادیوگراف های مکرر یک روز درمیان، بهبودی کامل خود بخودی حیوان را پس از گذشت ۱۰روز نوید نمودند.

کاربرد بالینی- آمفیزم سرتاسری زیرپوستی وقتی رخ می دهد که هوا شدیدا از طریق پارگی های تراکئوبرونشیال ویا جراحات ایجاد شده در داخل قفسه صدری و یا گردن نشت کند.این پدیده در سگها نادر بوده و عمدتا تجمع شدید هوا، باعث پارگی برده جنب ، بروز پنوموتوراکس و دیسپنه میگردد. قابل توجه آنکه در حیوان مورد نظر،هیچ گونه مشکلی متعاقب آسیب تراکنوبرونشیال بروز نکرد و حیوان بهبودی خودبه خودی یافت.

کلید واژگان- تورم سرتاسری زیریوستی، پنوموندیاستینوم، سگ.