ACUTE THORAX

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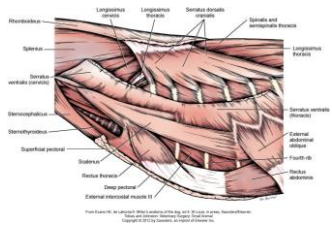
Skalpellen

ANATOMY

Thoracic cavity is formed by

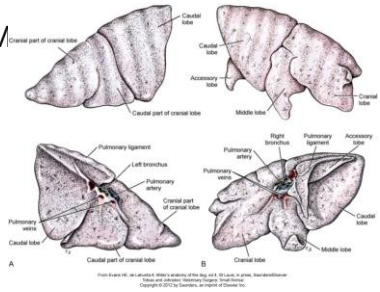
- ribs, vertebrae and sternum
- intercostal muscles
- muscle of the thoracic wall
- diaphragm

Intercostal nerve, vein and artery is located caudal to each rib

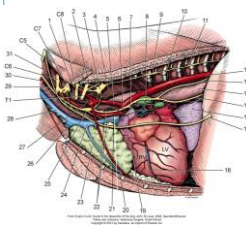


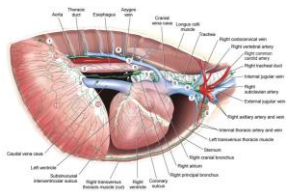
ANATOM

LUNGS



ANATOMY THORAX





ACUTE THORAX

The animal may be presented acute due to:

-trauma (blunt force or sharp trauma)

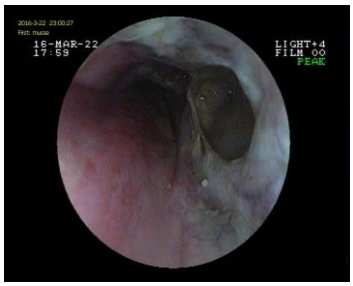
- endstage or acute crisis of an underlying disease

ACUTE THORAX

- Animals present with a rapid and sh breathing pattern
- Trauma (rib fracture, pulmonary contusion) can worsen ventilation
- Rapid accumulation of large amounts of fluid or air in the thoracic cavity results in acute tachypnea, dyspnea and collapse
- Less severe trauma may not lead to obvious respiratory symptoms

PNEUMOTHORAX

- Presence of air within the pleural space
- Loss of the natural negative pressure in thoracic cavity
- Air may enter from thoracic wall, esofagus or airways (lung, bronchus or trachea)
- Most common cause is leakage from thoracic wall penetration due to bitewounds or other trauma.



THORACIC BITE TRAUMA IN DOGS AND CATS: A RETROSPECTIVE STUDY OF 65 CASES

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Keywords

thorax, bite wound, thoracotomy, companion animals

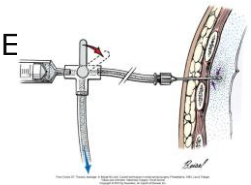
Summary

Objectives: To report a case series of thoracic bite trauma in dogs and cats and to evaluate risk factors for mortality. Methods: A retrospective study concerning thoracic bite wounds in dogs and cats was performed. Lesions were categorized by depth of penetration: no wound, superficial, deep or penetrating. Thoracic radiographic reports were reviewed. Lesion management was classified as non-surgical, wound exploration, or explorative thoracotomy. Results: Sixty-five cases were collected. Twenty-two percent of patients with normal respiratory patterns showed thoracic radiographic lesions. Respiratory distress was not correlated with mortality. Twenty-eight patients were presented with superficial wounds and 13 with deep wounds. Eight patients exhibited penetrating wounds. Radiographic lesions were observed in 77% of dogs and 100% of cats. Explorative thoracotomy was performed in 28% of patients, and surgical wound exploration in 17.2%. With the exception of skin wounds, thoracic wall discontinuity was the most frequent lesion. Thoracotomy was associated with increased length of hospitalisation but was not correlated with mortality. The mortality rate was 15.4%. No studied factor correlated with mortality, and the long-term outcomes were excellent. Clinical significance: A penetrating injury, more than three radiographic lesions, or both together seemed to be indicative of the need for a thoracotomy. In the absence of these criteria, systematic bite wound explorative surgery is recommended, with extension to thoracotomy if

HYDROTHORAX

- Abnormal amount of fluid in the thoracic cavity
- Causes decreased ventilatory volume and increased respiratory rate
- Easily recognized on x-ray or sonography
- Different types of fluid
- Thorakocentesis both to help the animal and for diagnostics

THORAKOCENTE



It´s easy, quick and cheap.

The type of fluid tells us a lot

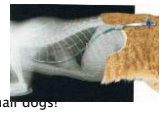
- Transudate
- Modified transudate
- Exudate

Classification of pleural effusion (clinically) in pure transudate, serosanguineous, sanguineous (hemorragic), inflammatory, chylous and neoplastic

Features	Transudate	Exudate
Process	Passive (increased pressure)	Active (inflammation)
Vascular permeability	normal	Increased
Plasma protein leak	Absent	Present
Protein content of fluid	Low S.G.<1012 Protein<1.5g/dl	High S.G >1020 Proteins> 1.5g/dl
Fibrin	absent	Present
Inflammatory cells	absent	present

THORACOSTOMY TUBE PLACEMENT

- Concider placing a thoracostomy tube if you suspect the patient requires repeated thoracocentesis
- Useful after thoracic surgery for monitoring hemorrage, fluid or air accumulation



- Tube should be premeasured
- Place it in the 7th or 8th intercostal space
- Secure with chinese-fingertrap suture
- Protect with a bandage- but careful in cats and small dogs!

THORACOSTOMY TUBE

THORACOSTOMY TUBE

THORACOSTOMY TUBE

When can I remove the tube?

Guideline is to remove the tube when the production of fluid is less than 2 ml/kg/day

In a study from Marques et al the median fluid production was 3 ml/kg/day for dogs and 5 ml/kg/day in cats at the time of removal.

THORACOSTOMY TUBE

Complications

- Blockage
- Accidental removal
- Subcutaneous emphysema
- Infection
- Foreign body reaction with time

THORACOSTOMY TUBE

Unusual complication…

DIAGNOSTICS

X-ray
Thorakocentes
CT
Thoracoskopi
Thorakotomi

SURGERY OR NOT?

Hydrothorax
- Most of the time **not** a surgical case

Pneumotorax
- Traumatic: Most of the time **not** a surgical case
- Spontaneous: Surgery is indicated in many cases

Lungdisease
- When mass effect is seen it becomes a surgical candidate

THORACOTOMY

Intercostal
- When diagnosis is known and only one side has to be explored

Rib resection
- To increase exposure
- Closure more difficult. Elevate periost

Median sterotomi
- Commonly used for approach to mediastional structures or pneumothorax of unknown origin

THORACOTOMY

Intercostal

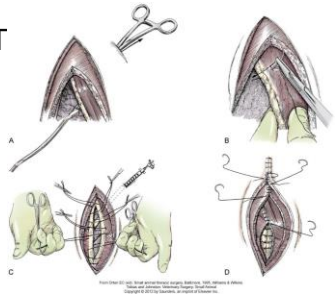
- Hilus of the lungs located at intercostal space 4-5
- Limited access to the structures on the ipsilateral side
- Very limited access to structures of the contralateral side

THORACOTOMY

Intercostal
- Skin incision through subcutaneous tissue and cutaneous trunci muscle
- M. latissimus dorsi is incised from ventral as much as needed
- Count the ribs!
- M. serratus ventralis is separated between muscebellys
- Scalenus /external oblique abdominal muscle
- Intercostal muscles are cut in the middle between ribs
- Avoid intrathoracical vessels near sternum

THORACOT

Closure of
Intercostal thoracotomy



THORACOTOMY

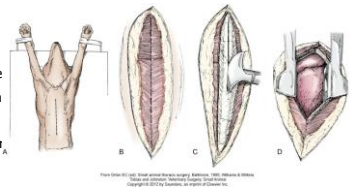
Median sternal

- Allows access to the whole thoracic cavity
- In humans less postop pain with sternotomy compared to intercostal approach
- Use median approach if not a clear, localized process

THORACOTOMY

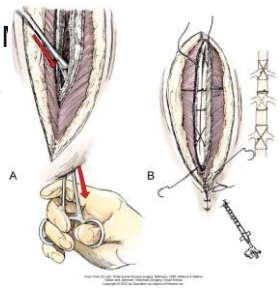
Median Sternotomy

- Dorsal recumbency
- Midline incision
- Pectoralis muscle dissecte
- Sternotomy with oscillatin or osteotome
- Xiphoid and/or manubriu should be left intact



THORACOTOI

Closure of median sternotomy



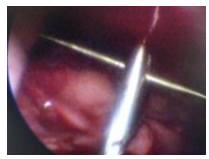
THORACOTOMY

Post op

- Monitor patient
- Thoracostomy tube
- Pain control
- Oxygene

THORACOSCOPY

- Minimal invasive method for examination of the thoracic cavity and its organs
- Intercostal or transdiaphragmatic approach
- A lot of instruments available for different surgerys



PNEUMOTHORAX - CASE

Mix breed hunting dog, male, 5 years

Was out hunting 5 days ago, started coughing afterwards but he didn´t continue to cough

Was not doing ok the next day

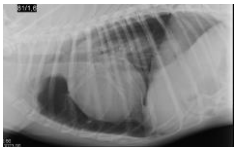
Didn´t want to eat for 5 days

Owner waited for the dog to recover, but friday afternoon he went to the vet

PNEUMOTHORAX - CASE

Clinical findings:

- Increased bodytemperature
- Very calm
- Increased respiratory frequens and dyspnoe
- Bloodwork: leukocytosis
- X-ray confirmed the suspicion of pneomothorax and injury of the lung



PNEUMOTHORAX - CASE

CT-scan was done:

" In the right caudal ventral pleural space there´s a fusiform shaped and fibrillated foreign body agains the thoracic wall, adjacent to the 9th rib costochondral junction"

Also lung consolidation, bilateral pneumothorax, mild pleural effusion, focal pleuritis and suspition of pleural bubbles

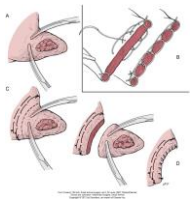
PNEUMOTHORAX - CASE

- Went to surgery
- Intercostal thoracotomy ICR 8
- Foreign body was found in pleural space
- Partial lobectomy of lacerated lung

PARTIAL LUNGLOBECTOMY

- Distal 2/3 or less
- Removal of isolated disease (abscess, bleb, bulla, laceration, neoplasia)
- If near apex- simple wedge or distal lobe amputation

PARTIAL LUNGLOBECTOMY



- Crushing forceps placed across lobe
- Continous, overlapping hemostatic-pneumostatic suture
- Cut and the transection site is oversewn
- Test for leakage
- Lobectomies in proximal 1/3 of the lobe -> ligate bronchi a d vessels seperately

LUNG LOBE TORSION

- Big deepchested dogs (Afghan)
  - secondary
  - chylothorax
  - trauma
  - thoraxsurg
  - neoplasia
- Pug
  - primary
  - spontaneous, idiopathic
  - young male dog
  - left cranial lobe

LUNG LOBE TORSION

- Diffuse symptoms
  - -dyspnoe
  - cough
  - vomiting
  - anorexia, weight loss
- Radiographs
  - Lung consolidation
  - Hydrothorax

LUNG LOBE TORSION

- Initial stabilization
- Thorakocentesis
- Surgery
  - Intercostal thoracotomy
  - Lobectomy
  - Try not to untwist the lobe
  - Stapler!

CYSTS, BULLA AND BLEB

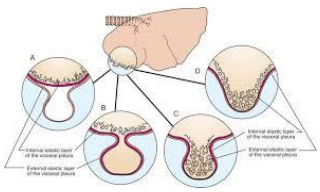
Cysts

- Air- or fluid filled
- Within lung parenchyma
- Covered with respiratory epthelium
- Most common cause is blunt trauma

Bulla and bleb

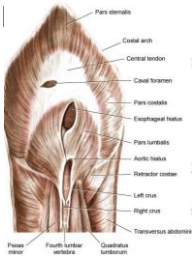
- Pseudocysts
- No epithelial lining
- Bulla = large airspaces that develope within lung parenchyma
- Bleb = Small accumulation of air between parenchym and visceral pleura

CYSTS, BULLA AND BLEBS



DIAPHRAGMATIC HE

- Congenital Pleuroperitoneal Hernia
- Congenital Peritoneopericardial Hernia
- Traumatic Pleuroperitoneal Hernia



DIAPHRAGMATIC HERNIA

Traumatic diaphragmatic hernia

- Most common cause blunt trauma
- Sudden increase in intraabdominal pressure with glottis open
- Lung contusion, pleural effusion, hemothorax, pneumpthorax, ribfracture
- 2% of dogs with fractures have diaphragmatic hernia
- Tears often in Pars costalis

DIAPHRAGMATIC HERNIA

Clinical findings

- Dyspnea
- Pain
- Hypoxia
- Shock
- Gastrointestinal symptoms
- Liver symptoms

DIAPHRAGMATIC HE

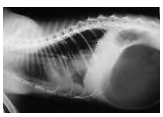
Radiographic signs

- Loss of normal diaphragmatic silohouette
- Unnormal heart silhouette
- Hydrothorax
- Abdominal organs in thorax

DIAPHRAGMATIC HE

Timing of surgery

- As early as possible after stabilisation
- Hernia higher priority than fracture
- With time situation can change
  - herniation of stomach
  - incarceration
  - tension pneomothorax



DIAPHRAGMATIC HERNIA

Surgery

- Midline incision from xiphoid
- Remove Lig falciforme
- Hernia reduction
- Avoid V cava and phrenic nerve
- Hernia closure
- Inspect abdominal organs

HYDROPERICARD

- Transudate
  - heart disease
  - peritoneopericardial diaphragmatic hernia
  - hyporoteinemia
- Exsudat
  - foreign body
  - FIP
- Blood
  - Trauma
  - Neoplasia
  - Idiopathic

HYDROPERICARD

- Pericardiocentesis
  - Low risk if done properly
  - Ultrasound guidance helpful
  - Local anesthetics
  - Intercostal space 5-6
  - Right side
- Pericardectomy

TACK FÖR MIG!