

ORAL PRESENTATION

Open Access

0894. Time course of VILI development: a CT scan study

C Chiurazzi^{1*}, M Gotti¹, M Amini¹, C Rovati¹, I Algieri¹, M Brioni¹, A Cammaroto¹, C Bacile di Castiglione¹, K Nikolla¹, C Montaruli¹, S Luoni¹, B Comini¹, G Rossignoli¹, G Conte¹, T Langer¹, M Cressoni¹, L Gattinoni^{1,2}

From ESICM LIVES 2014

Barcelona, Spain. 27 September - 1 October 2014

Introduction

Mechanical Ventilation at high tidal volumes and pressures induces in lung oedema which is undistinguishable from ARDS. It is possible that pleura, bronchi and vessels act as a natural stress raiser playing as local stress multipliers. [1]

Objectives

To study the development of VILI with CT scan and determine where and when the first lesions appear and to follow their development in time.

Methods

Piglets were instrumented and ventilated with TV of corresponding to a strain (TV/FRC) >2.5. The whole study was performed in an animal CT scan facilities equipped as an ICU. Every three hours a CT scan was performed and data on respiratory mechanics were collected. CT scans were analysed and lesions were defined as clearly defined regions of poorly/not inflated tissue (-500/+100 HU) with a minimal diameter of 6 mm non present in the previous CT scan image. Lung weight was computed from the CT scan data.

Results

We studied 11 swine (22±5 kg), 5 healthy and 6 with basal densities which did not regain inflation after a recruitment manoeuvre. As shown in Figure 1 most the CT scan lesions were subpleural. The first CT scan lesions appeared after a median of 7 hours [4.5-12] in healthy pigs and after a median of 9 hours [6.5-11.5] in diseased ones (p=0.88 healthy vs diseased) while changes in lung mechanics developed after 20 [13 - 23] hours (p = 0.04 vs time of development of CT scan lesions) and oxygenation impairment, defined as PaO₂/F_iO₂ < 200, after 25 [14 - 36] hours (p = 0.003 vs time of development of CT scan lesions) while widespread lung oedema defined as presence of infiltrations in all lung fields at CT scan imaging developed after 18 [12 - 32] hours (p = 0.02 vs time of development of CT scan lesions).

Conclusions

Oxygenation and respiratory mechanics impairment is evident when relevant lung oedema develops. Most of the first CT scan lesions are located in lung regions which act as stress raisers and precede alterations in gas exchange and respiratory mechanics.

¹Università degli Studi di Milano, Dipartimento di Fisiopatologia Medica e dei Trapianti, Milano, Italy

Full list of author information is available at the end of the article

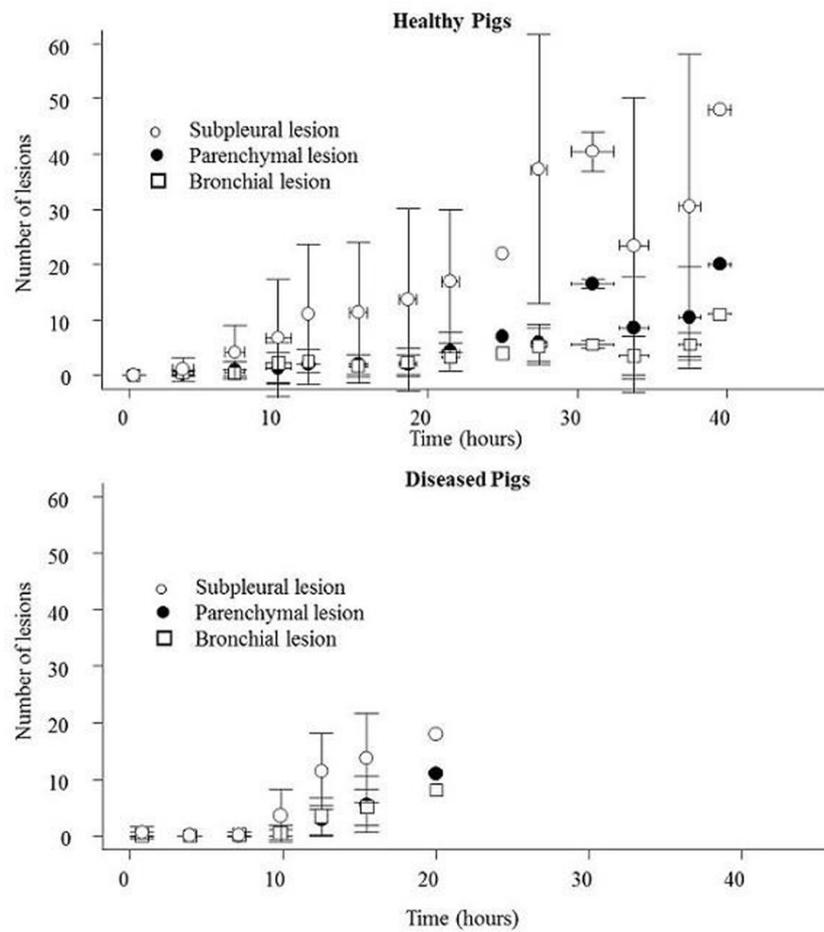


Figure 1 VILI Lesion Time Course.

Grant acknowledgment

ESICM Bernard Drager Award 2012 to M.C.

Authors' details

¹Università degli Studi di Milano, Dipartimento di Fisiopatologia Medica e dei Trapianti, Milano, Italy. ²Fondazione IRCCS Ca' Granda - Ospedale Maggiore Policlinico, Milano, Italy.

Published: 26 September 2014

Reference

1. Cressoni M, Cadringer P, Chiurazzi C, Amini M, Gallazzi E, Marino A, Brioni M, Carlesso E, Chiumello D, Quintel M, Bugedo G, Gattinoni L: Lung inhomogeneity in patients with acute respiratory distress syndrome. *Am J Respir Crit Care Med* 2014, **189**(2):149-158.

doi:10.1186/2197-425X-2-S1-O20

Cite this article as: Chiurazzi et al.: 0894. Time course of VILI development: a CT scan study. *Intensive Care Medicine Experimental* 2014 **2**(Suppl 1):O20.

Submit your manuscript to a SpringerOpen® journal and benefit from:

- Convenient online submission
- Rigorous peer review
- Immediate publication on acceptance
- Open access: articles freely available online
- High visibility within the field
- Retaining the copyright to your article

Submit your next manuscript at ► springeropen.com