

6. LITERATURVERZEICHNIS

- 1 Ashbaugh DG, Bigelow DB, Petty TL, et al. Acute respiratory distress in adults. Lancet 1967; 2:319-323.
- 2 Krafft P, Fridrich P, Pernerstorfer T, et al. The acute respiratory distress syndrome: definitions, severity and clinical outcome. An analysis of 101 clinical investigations. Intensive Care Med 1996; 22(6): 519-29.
- 3 Montgomery AB, Stager MA, Carrico CJ, et al. Causes of mortality in patients with the adult respiratory distress syndrome. Am Rev Respir Dis 1985; 132:485-9.
- 4 Demling RH. Adult respiratory distress syndrome: current concepts. New Horiz. 1993; 1(3):388-401.
- 5 Ferring M, Vincent JL. Is outcome from ARDS related to the severity of respiratory failure? Eur Respir J 1997; 10(6): 1297-300.
- 6 Villar J, Manzano J, Blazquez MA, et al. Multiple system organ failure in acute respiratory failure. J Crit Care 1991; 6: 75-80.
- 7 Dreyfuss D, Saumon G. Ventilator-induced lung injury: lessons from experimental studies. Am J Respir Crit Care Med 1998; 157(1): 294-323.
- 8 Slutsky AS, Tremblay L. Multiple system organ failure. Is mechanical ventilation a contributing factor? Am J Respir Crit Care Med 1998; 157: 1721-5.
- 9 Dreyfuss D, Soler P, Bassett G, et al. High inflation pressure pulmonary edema. Respective effects of high airway pressure, high tidal volume, and positive end-expiratory pressure. Am Rev Respir Dis 1988 ; 137(5): 1159-64.
- 10 Verbrugge SJ, Bohm SH, Gommers D, et al. Surfactant impairment after mechanical ventilation with large alveolar surface area changes and effects of positive end-expiratory pressure. Br J Anaesth 1998; 80(3): 360-4.
- 11 Tremblay L, Valenza F, Ribeiro SP, et al. Injurious ventilatory strategies increase cytokines and c-fos m-RNA expression in an isolated rat lung model. J Clin Invest 1997; 99(5): 944-52.
- 12 Von Bethmann AN, Brasch F, Nusing R, et al. Hyperventilation induces release of cytokines from perfused mouse lungs. Am J Respir Crit Care Med 1998; 157: 263-272.
- 13 Tutor JD, Mason CM, Dobard E, et al. Loss of compartmentalization of alveolar tumor necrosis factor after lung injury. Am J Respir Crit Care Med 1994; 149(5): 1107-11.

- 14 Von Neergaard K. Neue Auffassungen über einen Grundbegriff der Atemmechanik; Die Retraktionskraft der Lunge, abhängig von der Oberflächenspannung in den Alveolen. Z Ges Exp Med 1929; 66: 373-394.
- 15 Avery M., Mead J. Surface properties in relation to atelectasis and hyaline membrane disease. Am J Dis Child 1959; 97: 517-523.
- 16 Johansson J, Curstedt T, Robertson B. The proteins of the surfactant system. Eur Respir J 1994 ; 7(2): 372-91.
- 17 Van Golde LM, Batenburg JJ, Robertson B. The pulmonary surfactant system: biochemical aspects and functional significance. Physiol Rev 1988; 68(2): 374-455.
- 18 Robertson B, van Golde LM, Batenburg JJ. Pulmonary Surfactant: From Molecular Biology to Clinical Practice. Elsevier, Amsterdam 1984.
- 19 Tenner AJ, Robinson SL, Borchelt J, et al. Human pulmonary surfactant protein (SP-A), a protein structurally homologous to C1q, can enhance FcR- and CR1-mediated phagocytosis. J Biol Chem 1989; 264(23): 13923-8.
- 20 Van Iwaarden F, Welmers B, Verhoef J, et al. Pulmonary surfactant protein A enhances the host-defense mechanism of rat alveolar macrophages. Am J Respir Cell Mol Biol 1990; 2(1): 91-8.
- 21 Revak SD, Merritt TA, Degryse E, et al. Use of human surfactant low molecular weight apoproteins in the reconstitution of surfactant biologic activity. J Clin Invest 1988 ; 81(3): 826-33.
- 22 Kuroki Y, Shiratori M, Ogarawasa Y, et al. Characterization of pulmonary surfactant protein D: its copurification with lipids. Biochim Biophys Acta 1991; 1086(2): 185-90.
- 23 Lachmann B, Winsel K, Reutgen H. Der Anti-Atelektase-Faktor der Lunge I. Z Erkr Atm 1972; 137: 267-287.
- 24 Macklem PT, Proctor DF, Hogg JC. The stability of peripheral airways. Respir Physiol 1970; 8(2): 191-203.
- 25 Lachmann B. Possible function of bronchial surfactant. Eur J Respir Dis Suppl 1985; 142: 49-61.
- 26 Reifenrath R. Surfactant action in bronchial mucus. In: Cosmi Ev, Scarpelli EM (Eds). Pulmonary surfactant system. Elsevier, Amsterdam 1983: 339-347.
- 27 So KL, Gommers D, Lachmann B. Bronchoalveolar surfactant system and intratracheal adrenaline. Lancet 1993; 341(8837):120-1.
- 28 Guyton AC, Moffat DS, Adair TA. Role of alveolar surface tension in transepithelial movement of fluid. In: Robertson B, van Golde LM, Batenburg JJ:

- Pulmonary Surfactant: From Molecular Biology to Clinical Practice. Elsevier, Amsterdam 1984.
- 29 Wright JR, Youmans DC. Pulmonary surfactant protein A stimulates chemotaxis of alveolar macrophage. *Am J Physiol* 1993; 264(4 Pt 1): L338-44.
- 30 Van Iwaarden JF, van Strijp JA, Ebskamp MJ, et al. Surfactant protein A is opsonin in phagocytosis of herpes simplex virus type 1 by rat alveolar macrophages. *Am J Physiol* 1991; 261(2 Pt 1): L204-9.
- 31 Seeger W, Gunther A, Walmarth HD, et al. Alveolar surfactant and adult respiratory distress syndrome. Pathogenetic role and therapeutic prospects. *Clin Investig* 1993; 71(3): 177-90.
- 32 Lachmann B, Eijking EP, So KL, et al. In vivo evaluation of the inhibitory capacity of human plasma on exogenous surfactant. *Intensive Care Med* 1994; 20(1): 6-11.
- 33 Bos JAH, Lachmann B. Effects of artificial ventilation on surfactant function. In: Rügheimer E (Ed). New aspects on respiratory failure. Springer Verlag, Berlin 1992: 194-208.
- 34 Walters DV. The role of pulmonary surfactant in transepithelial movement of fluid. In: Robertson B, van Golde LM, Batenburg JJ (eds.) Pulmonary Surfactant:from Molekular Biology to clinical Practise. Elsevier, Amsterdam 1992; 193-213.
- 35 Gommers D, Lachmann B. Surfactant therapie: does it have a role in adults? *Clin Intensive Care* 1993; 4: 284-295.
- 36 Wollmer P, Jonson B, Lachmann B. Evaluation of lung permeability in neonatal and adult respiratory distress syndrom. In: Robertson B, Tauesch HW (eds). Surfactant therapie for lung disease. Marcel Dekker, New York 1995: 199-213.
- 37 Nash G, Bowen JA, Langlinais PC. "Respirator lung": a misnomer. *Arch Pathol* 1971; 21: 234-240.
- 38 West JB, Mathieu-Costello O. Stress failure of pulmonary capillaries: role in lung and heart disease. *Lancet* 1992; 340(8822): 762-7.
- 39 Egan EA, Nelson RM, Olver RE. Lung inflation and alveolar permeability to non-electrolytes in the adult sheep in vivo. *J Physiol* 1976; 260 (2): 409-24.
- 40 Kim KJ, Crandall ED. Effects of lung inflation on alveolar epithelial solute and water transport properties. *J Appl Physiol* 1982; 52(6): 1498-505.
- 41 Mead J, Takishima T, Leith D. Stress distribution in lungs: a model of pulmonary elasticity. *J Appl Physiol* 1970; 28: 596-608.

- 42 Muscedere J, Mullen JBM, Gan K, Slutsky AS. Tidal ventilation at low airway pressures can augment lung injury. *Am J Respir Crit Care Med* 1994; 149(5): 1327-34.
- 43 Mead J, Collier C. Relationship of volume history of lungs to respiratory mechanics in anaesthetised dogs. *J Appl Physiol* 1959; 14: 669-678.
- 44 Greenfield LJ, Ebert P, Benson DW. Effects of positive pressure ventilation on surface tension properties of lung extracts. *Anesthesiology* 1964; 25: 312-6.
- 45 Veldhuizen RA, Marcou J, Yao LJ, et al. Alveolar surfactant aggregate conversion in ventilated normal and injured rabbits. *Am J Physiol* 1996; 270: 152-8.
- 46 Ito Y, Veldhuizen RA, Yao LJ, et al. Ventilation strategies affect surfactant aggregate conversion in acute lung injury. *Am J Respir Crit Care Med* 1997; 155(2): 493-9.
- 47 Lachmann B, Hallman M, Bergmann KC. Respiratory failure following anti-lung serum: study on mechanisms associated with surfactant system damage. *Exp Lung Res* 1987; 12(2): 163-80.
- 48 Kobayashi T, Nitta K, Ganzuka M, et al. Inactivation of exogenous surfactant by pulmonary edema fluid. *Pediatr Res* 1991; 29: 353-6.
- 49 Caldini P, Leith JD, Brennan MJ. Effect of continuous positive-pressure ventilation (CPPV) on edema formation in dog lung. *J Appl Physiol* 1975; 39(4): 672-9.
- 50 Toung T, Saharia P, Permutt S, et al. Aspiration pneumonia: beneficial and harmful effects of positive end-expiratory pressure. *Surgery* 1977; 82(2): 279-83.
- 51 Hopewell PC, Murray JF. Effects of continuous positive-pressure ventilation in experimental pulmonary edema. *J Appl Physiol* 1976; 40(4): 568-74.
- 52 Pare PD, Warriner B, Baile EM, et al. Redistribution of pulmonary extravascular water with positive end-expiratory pressure in canine pulmonary edema. *Am Rev Respir Dis* 1983; 127(5): 590-3.
- 53 Malo J, Ali J, Wood LD. How does positive end-expiratory pressure reduce intrapulmonary shunt in canine pulmonary edema? *J Appl Physiol* 1984; 57(4): 1002-10.
- 54 Demling RH, Staub NC, Edmunds LH. Effect of end-expiratory airway pressure on accumulation of extravascular lung water. *J Appl Physiol* 1975; 38(5): 907-12.
- 55 Bshouty Z, Ali J, Younes M. Effect of tidal volume and PEEP on rate of edema formation in in situ perfused canine lobes. *J Appl Physiol* 1988; 64(5): 1900-7.

- 56 Webb HH, Tierney DF. Experimental pulmonary edema due to intermittent positive pressure ventilation with high inflation pressures. Protection by positive end- expiratory pressure. *Am Rev Respir Dis* 1974; 110(5): 556-65.
- 57 Corbridge TC, Wood LD, Crawford GP, et al. Adverse effects of large tidal volume and low PEEP in canine acid aspiration. *Am Rev Respir Dis* 1990; 142(2): 311-5.
- 58 Dreyfuss DG, Basset G, Soler P, et al. Intermittent positive-pressure hyperventilation with high inflation pressures produces pulmonary microvascular injury in rats. *Am Rev Respir Dis* 1985; 132(4): 880-4.
- 59 Hopewell PC. Failure of positive end-expiratory pressure to decrease lung water content in alloxan-induced pulmonary edema. *Am Rev Respir Dis* 1979; 120(4): 813-9.
- 60 Dreyfuss D, Sauman G. Role of tidal volume, FRC, and end-inspiratory volume in the development of pulmonary edema following mechanical ventilation. *Am Rev Respir Dis* 1993; 148(5): 1194-203.
- 61 Wyszogrodski I, Kyei-Aboagye K, Taeusch HW, Avery ME. Surfactant inactivation by hyperventilation: conservation by end-expiratory pressure. *J Appl Physiol* 1975; 38(3): 461-6.
- 62 Tyler DC. Positive end-expiratory pressure: a review. *Crit Care Med* 1983; 11(4): 300-8.
- 63 Verbrugge SJC, Šorm V, Gommers D, Lachmann B. Exogenous surfactant prevents ventilation-induced lung injury. *Eur Resp J* 1997; 25: S398.
- 64 Rogers D, Boschetto P, Barnes PJ. Correlation between Evans blue dye and radiolabelled albumin in guinea pig airways in vivo. *J Pharm Methods* 1989; 21: 309-15.
- 65 Argiras EP, Blakeley CR, Dunnill MS, Otremski S, Sykes MK. High PEEP decreases hyaline membrane formation in surfactant deficient lungs. *Br J Anaesth* 1987; 59: 1278-85.
- 66 Sandhar B, Niblett DJ, Argiras EP, Dunnill MS, Sykes MK. Effects of positive end-expiratory pressure on hyaline membrane formation in a rabbit model of the neonatal respiratory distress syndrome. *Intens Care Med* 1988; 14: 538-46.
- 67 Taskar V, John E, Evander P, Wollmer P, Robertson B, Jonson B. Healthy lungs tolerate repetitive collapse and reopening during short periods of mechanical ventilation. *Acta Anaesthesiol Scan* 1995; 39: 370-76.
- 68 Taskar V, John E, Evander P, Robertson B, Jonson B. Surfactant dysfunction makes lungs vulnerable to repetitive collapse and reexpansion. *Am J Respir Crit Care Med* 1997; 155(1): 313-20.

- 69 Kolobow T, Miretti MP, Fumagelli R, et al. Severe impairment in lung function induced by high peak airway pressure during mechanical ventilation. An experimental study. *Am Rev Respir Dis* 1987;135(2): 312-5.
- 70 Tremblay LN, Slutsky AS. Ventilator-induced injury: from barotrauma to biotrauma. *Proc Assoc Am Physicians* 1998; 110(6): 482-8.
- 71 Parker JC, Hernandez LA, Peevy KJ. Mechanisms of ventilator-induced lung injury. *Crit Care Med* 1993; 21(1):131-43.
- 72 Lansman JB, Hallam TJ, Rink TJ. Single stretch-activated ion channels in vascular endothelial cells as mechanotransducers? *Nature* 1987; 325(6107): 811-3.
- 73 Martin DK, Bootcov MR, Campbell TJ, French PW, Breit SN. Human macrophages contain a stretch-sensitive potassium channel that is activated by adherence and cytokines. *J Membr Biol* 1995; 147(3): 305-15.
- 74 Felix JA, Woodruff ML, Dirksen ER. Stretch increases inositol 1,4,5-trisphosphate concentration in airway epithelial cells. *Am J Respir Cell Mol Biol* 1996; 14(3): 296-301.
- 75 Von Bethmann AN, Brasch F, Mueller K, Wendel A, Uhlig S. Prolonged hyperventilation is required for release of tumor necrosis factor alpha but not IL-6. *Appl Cardiopulm Pathophysiol* 1996; 6: 171-177.
- 76 Ranieri VM, Suter PM, Tortorella C, et al. Effect of mechanical ventilation on inflammatory mediators in patients with acute respiratory distress syndrome: a randomized controlled trial. *Jama* 1999; 282(1): 54-61.
- 77 Wheeler A, Wickersham N, Ancukiewicz M, et al. Low Tidal Volume Ventilation Reduces Plasma Cytokines in Human Acute Lung Injury. *Am J Respir Crit Care Med* 2000; 161:A.
- 78 Verbrugge SJ, Uhlig S, Neggers SJ, et al. Different ventilation strategies affect lung function but do not increase tumor necrosis factor-alpha and prostacyclin production in lavaged rat lungs in vivo. *Anesthesiology* 1999; 91(6): 1834-43.
- 79 Ricard JD, Dreyfuss D, Saumon G. Production of inflammatory cytokines in ventilator-induced lung injury: a reappraisal. *Am J Respir Crit Care Med* 2001 Apr; 163(5): 1176-80.
- 80 Wrigge H, Zinserling J, Stuber F, et al. Effects of mechanical ventilation on release of cytokines into systemic circulation in patients with normal pulmonary function. *Anesthesiology* 2000 Dec; 93(6): 1413-7.
- 81 Nelson S, Bagby GJ, Bainton BG, et al. Compartmentalization of intraalveolar and systemic lipopolysaccharide-induced tumor necrosis factor and the pulmonary inflammatory response. *J Infect Dis* 1989; 159(2): 189-94.

- 82 Dehoux MS, Boutten A, Ostinelli J, et al. Compartmentalized cytokine production within the human lung in unilateral pneumonia. *Am J Respir Crit Care Med* 1994; 150(3): 710-6.
- 83 Ghofrani HA, Rousseau S, Walmrath D, et al. Compartmentalized lung cytokine release in response to intravascular and alveolar endotoxin challenge. *Am J Physiol* 1996; 270: L62-8.
- 84 Boujoukos AJ, Martich GD, Supinski E, Suffredini AF. Compartmentalization of the acute cytokine response in humans after intravenous endotoxin administration. *J Appl Physiol* 1993; 74(6): 3027-33.
- 85 Evander E, Wollmer P, Jonson B, Lachmann B. Pulmonary clearance of inhaled 99mTc-DTPA: effects of surfactant depletion by lung lavage. *J Appl Physiol* 1987; 62(4): 1611-4.
- 86 Gruenwald P. A numerical index stability of lung expansion. *J Appl Physiol* 1963; 88: 359-367.
- 87 Bradford MM. A rapid and sensitive method for the quantitation of microgram quantities of protein utilizing the principle of protein-dye binding. *Anal Biochem* 1976; 72: 248-54.
- 88 Bligh EG, Dyer DW. A rapid method of total lipid extraction and purification. *Can J Biochem Physiol* 1959; 37: 911-17.
- 89 Rouser G, Fleischer S, Yamamoto A. Two dimensional thin layer chromatographic separation of polar lipids and determination of phospholipids by phosphorus analysis of spots. *Lipids* 1970; 5: 494-6.
- 90 Haitsma JJ, Uhlig S, Goggel R, Verbrugge SJ, Lachmann U, Lachmann B. Ventilator-induced lung injury leads to loss of alveolar and systemic compartmentalization of tumor necrosis factor-alpha. *Intensive Care Med* 2000; 26(10): 1515-22.
- 91 Haitsma JJ, Uhlig S, Lachmann U, Verbrugge SJ, Poelma DL, Lachmann B. Exogenous surfactant reduces ventilator-induced decompartmentalization of tumor necrosis factor alpha in absence of positive end-expiratory pressure. *Intensive Care Med* 2002; 28(8): 1131-7.
- 92 Regel G, Grotz M, Weltner T, Sturm JA, Tscherne H. Pattern of organ failure following severe trauma. *World J Surg* 1996; 20(4): 422-9.
- 93 Luhr OR, Antonsen K, Karlsson M, et al. Incidence and mortality after acute respiratory failure and acute respiratory distress syndrome in Sweden, Denmark, and Iceland. The ARF Study Group. *Am J Respir Crit Care Med* 1999; 159(6): 1849-61.

- 94 Amato MB, Barbas CS, Medeiros DM, et al. Effect of a protective-ventilation strategy on mortality in the acute respiratory distress syndrome. *N Engl J Med* 1998; 338(6): 347-54.
- 95 Esteban A, Anzueto A, Alia I, et al. How is mechanical ventilation employed in the intensive care unit? An international utilization review. *Am J Respir Crit Care Med* 2000; 161(5): 1450-8.
- 96 Gattinoni L, Pesenti A, Avalli L, Rossi F, Bombino M. Pressure-volume curve of total respiratory system in acute respiratory failure. Computed tomographic scan study. *Am Rev Respir Dis* 1987; 136(3): 730-6.
- 97 Dreyfuss D, Soler P, Saumon G. Mechanical ventilation-induced pulmonary edema. Interaction with previous lung alterations. *Am J Respir Crit Care Med* 1995; 151(5): 1568-75.
- 98 Jansson L, Jonson B. A theoretical study on flow patterns of ventilators. *Scand J Respir Dis* 1972; 53(4): 237-46.
- 99 Albert RK, Lakshminarayan S, Hildebrandt J, Kirk W, Butler J. Increased surface tension favors pulmonary edema formation in anesthetized dogs' lungs. *J Clin Invest* 1979; 63(5): 1015-8.
- 100 Verbrugge SJ, Sorm V, van 't Veen A, et al. Lung overinflation without positive end-expiratory pressure promotes bacteremia after experimental Klebsiella pneumoniae inoculation. *Intensive Care Med* 1998; 24(2): 172-7.
- 101 Chiumello D, Pristine G, Slutsky AS. Mechanical ventilation affects local and systemic cytokines in an animal model of acute respiratory distress syndrome. *Am J Respir Crit Care Med* 1999; 160(1): 109-16.
- 102 Ferrari-Baliviera E, Mealy K, Smith RJ, Wilmore DW. Tumor necrosis factor induces adult respiratory distress syndrome in rats. *Arch Surg* 1989; 124(12): 1400-5.
- 103 Stamme C, Bundsuh DS, Hartung T, et al. Temporal sequence of pulmonary and systemic inflammatory responses to graded polymicrobial peritonitis in mice. *Infect Immun* 1999; 67(11): 5642-50.
- 104 Michie HR, Wilmore DW. Sepsis, signals, and surgical sequelae (a hypothesis). *Arch Surg* 1990; 125(4): 531-6.
- 105 Armstrong L, Thickett DR, Christie SJ, Kendall H, Millar AB. Increased expression of functionally active membrane-associated tumor necrosis factor in acute respiratory distress syndrome. *Am J Respir Cell Mol Biol* 2000; 22(1): 68-74.
- 106 Tran Van Nhieu J, Misset B, Lebargy F, Carlet J, Bernaudin JF. Expression of tumor necrosis factor-alpha gene in alveolar macrophages from patients with the

- adult respiratory distress syndrome. Am Rev Respir Dis 1993; 147(6 Pt 1): 1585-9.
- 107 Donnelly SC, Strieter RM, Kunkel SL, et al. Interleukin-8 and development of adult respiratory distress syndrome in at-risk patient groups. Lancet 1993; 341(8846): 643-7.
- 108 Meduri G, Kohler G, Headley S, et al. Inflammatory cytokines in the BAL of patients with ARDS. Persistent elevation over time predicts poor outcome. Chest 1995; 108(5): 1303-14.
- 109 Stuber F, Wrigge H, Schroeder S, et al. Kinetic and reversibility of mechanical ventilation-associated pulmonary and systemic inflammatory response in patients with acute lung injury. Intensive Care Med 2002; 28(7): 834-41.
- 110 Parsons PE, Eisner MD, Thompson BT, et al. Lower tidal volume ventilation and plasma cytokine markers of inflammation in patients with acute lung injury. Crit Care Med 2005; 33(1): 1-6.
- 111 The Acute Respiratory Distress Syndrome Network. Ventilation with lower tidal volumes as compared with traditional tidal volumes for acute lung injury and the acute respiratory distress syndrome. N Engl J Med 2000; 342(18): 1301-8.
- 112 Hickling KG, Henderson SJ, Jackson R. Low mortality associated with low volume pressure limited ventilation with permissive hypercapnia in severe adult respiratory distress syndrome. Intensive Care Med 1990; 16(6): 372-7.
- 113 Slutsky AS. Mechanical ventilation. American College of Chest Physicians' Consensus Conference. Chest 1993; 104(6): 1833-1859.
- 114 Lewis JF, Ikegami M, Jobe AH. Altered surfactant function and metabolism in rabbits with acute lung injury. J Appl Physiol 1990; 69(6): 2303-10.
- 115 Veldhuizen RA, McCaig LA, Akino T, Lewis JF. Pulmonary surfactant subfractions in patients with the acute respiratory distress syndrome. Am J Respir Crit Care Med 1995; 152(6 Pt 1): 1867-71.
- 116 Malloy JL, Veldhuizen RA, Lewis JF. Effects of ventilation on the surfactant system in sepsis-induced lung injury. J Appl Physiol 2000; 88(2): 401-8.
- 117 Talati AJ, Crouse DT, English BK, Newman C, Livingston L, Meals E. Exogenous bovine surfactant suppresses tumor necrosis factor-alpha release by murine macrophages stimulated by genital mycoplasmas. J Infect Dis 1998; 178(4): 1122-5.
- 118 Borron P, McIntosh JC, Korfhagen TR, Whitsett JA, Taylor J, Wright JR. Surfactant-associated protein A inhibits LPS-induced cytokine and nitric oxide production in vivo. Am J Physiol Lung Cell Mol Physiol 2000; 278(4): L840-7.