Pleurale Infektionen

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Geschichte

Geschichte

500 v.C. Hippokrates von Kos - offene Drainage bei Empyem

Bis zum 19Jh. offene Thoraxdrainage als Behandlung der Wahl, Mortalität bis zu 70% infolge respiratorischen Versagens bei offenem Pneumothorax

1876 geschlossene Thoraxdrainage,

mangelnde Akzeptanz bis zur Influenza Epidemie 1917-1919, Mortalität 4.3%

1894 Lungendekortikation bei Empyem (Delorme)

1915 Erste Myoplastik für Obliteration der Pleurahöhle bei chronischem Empyem (Robinson)

1918 Rippenresektion bei Empyem

Geschichte

Reduktion der Inzidenz mit Einführung der Antibiotika

- Str. pneumoniae 60% > 10-20%
- Staph. aureus häufiger und resistenter

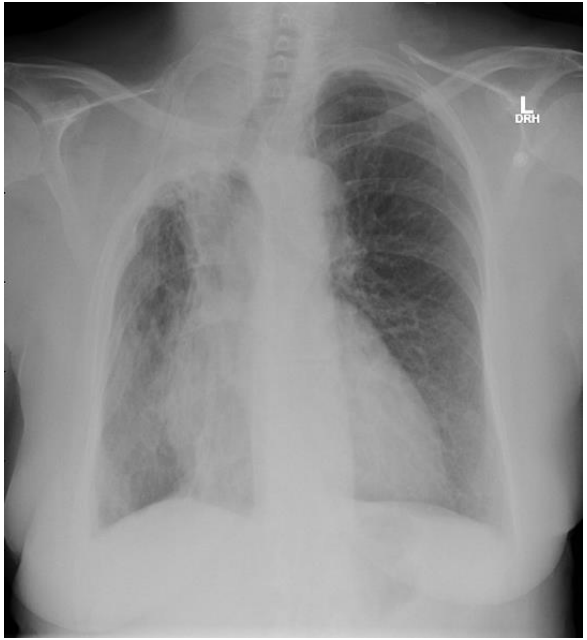
1949 Intrapleurale Fibrinolyse (Tillet & Sherry)

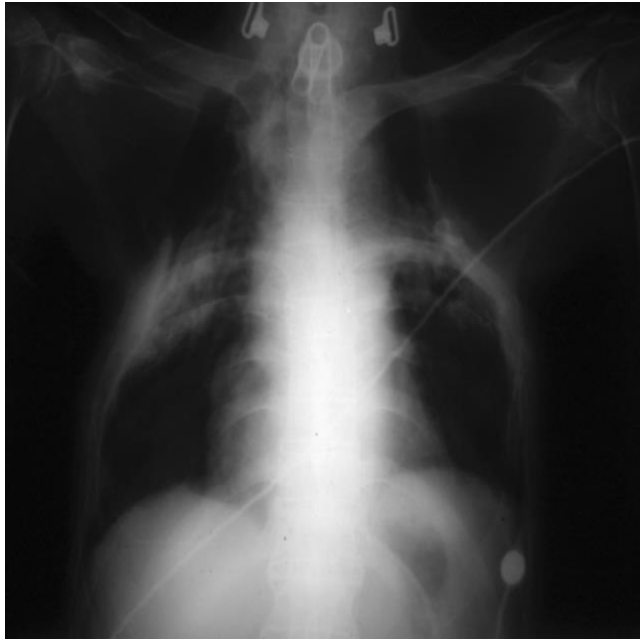
1963 Thorakostomie (Clagett & Geraci)

1983 Intrathorakale Transposition von extrathorakalen Muskel (Pairolero et al.)

1991 Thorakoskopie für Empyembehandlung (Wakabayashi)

Thorakoplastik





Risikofaktoren

Risikofaktoren

- Pneumonie – ca. 40-50% mit Erguss
- Diabetes mellitus
- Immunosuppresion
- Alkoholmissbrauch
- i.v. Betäubungsmittel
- Postoperativ 16%

Risikofaktoren

- Posttraumatisch 10%
- Ösophagusperforation
- Gastroösophagealer Reflux
- Neurologische Erkrankungen mit Dysphagie
- Atypische Erreger
- Iatrogen

Symptome

Oft unspezifisch, schwer von einer Pneumonie bzw. Lungenabszess zu differenzieren

Husten, Fieber, Schüttelfrost, Pleuritische Schmerzen, Dyspnoe
Reduzierte AG, abgeschwächte Perkussion

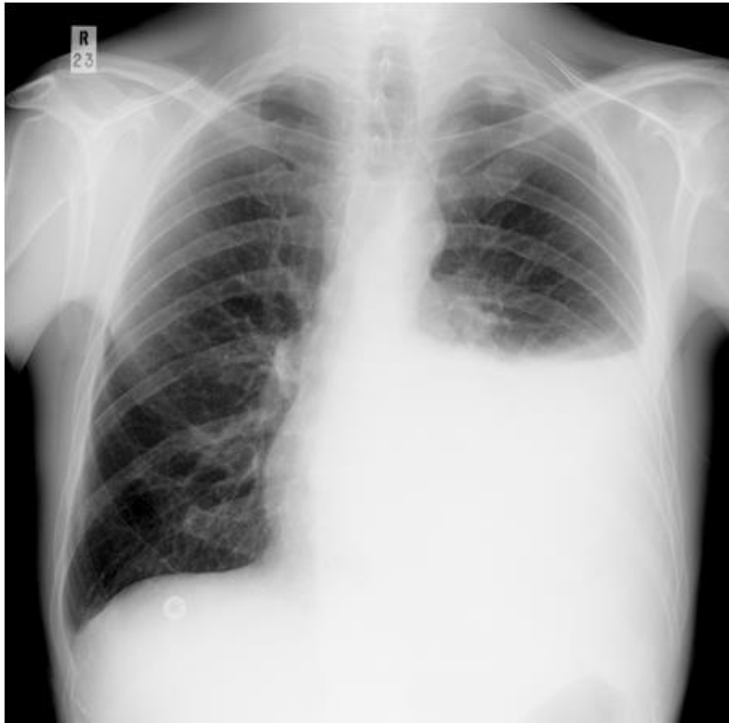
Gewichtsverlust und Anämie im chronischen Verlauf

Bildgebende Diagnostik

Rö-Thorax in 2 Ebenen

Ab ca. 200 ml path. Befund

Keine Aussage über den Erguss



Sonographie

Ab ca. 10ml erfassbar

Direkte Aussage über Morphologie, pleurale Verhältnisse, Grösse

Am Patientenbett möglich

Kosteneffektiv

Geeignete Stelle für Thorakozentese fehlende Strahlenbelastung

Empfehlungsgrad B
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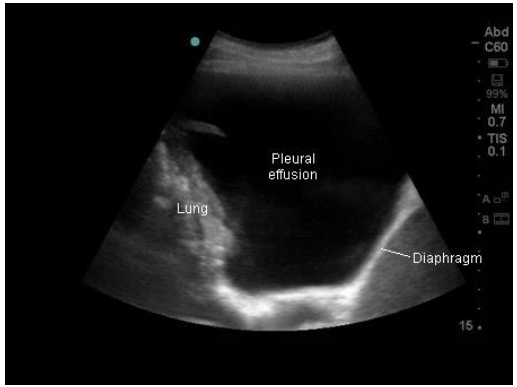

Homogen, echoarm

Inhomogen, echoreich, septiert

CT Thorax mit KM

Kompressionsatelektasen

Zwerchfellhochstand

Pleuraenhancement mit Verdickung

Lufteinschlüsse

Bei V.a. pleurale Infektion sollte eine CT Thorax durchgeführt werden

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Pleuraerguss

Pleuraerguss

Light`s Kriterien	Exsudat	Transudat
LDH (Erguss/Serum)	> 0.6 > 2/3 obere Grenze	< 0.6
Proteine (Erguss/Serum)	> 0.5	< 0.5

Glukose < 60mg/dl: Exsudat, Rheuma, Lupus, Ösophagusruptur, TBC

pH < 7.2: Exsudat, Rheumatoide Arthritis, Malignität

Pleuraerguss

Tab. 2 Klassifikation des parapneumonischen Pleuraergusses/Empyems nach Muers [20]

	Unkomplizierter PPE	Komplizierter PPE	Empyem
Pleurale Morphologie	Dünn, permeabel	Fibrinexsudation, Septierung	Verdickt, Granulationsgewebe, Septen und Kammern
Pleurapunktat	Klar	Trüb	Eitrig
pH[a]	>7,3	7,1–7,2 (7,3)	<7,1
Lactathydrogenase[a]	<500	>1000	>1000
Glukose [mg/dl]	>60	<40	<40
Zytologie	PMN +	PMN ++	PMN +++
Mikrobiologie	Steriles Punktat	Gelegentlich positiv	Häufig positiv (mikroskopisch + kulturell)

[a]Bestimmung im Pleurasekret; PMN polymorphkernige Neutrophile; PPE parapneumonischer Erguss. (Mod. nach Muers [20]).

Therapie

Ziele

Primärziele:

1. Infektevakuation + Säuberung der Pleurahöhle
2. Reexpansion der Lunge mit evtl. Füllung der Resthöhle

Sekundärziele:

Reduktion der Immobilisation

Verkürzung des Krankenhausaufenthaltes

Verkürzung der Behandlungsdauer

Senkung der Kosten

Prätherapeutische Fragen

Genese der Infektion

Lungenverhältnisse (Z.n. partieller Resektion, Pneumonektomie)

Vorliegen einer chronischen Fistel (bronchial, ösophageal, billär, pankreas)

Muskelverhältnisse

Ernährungsstatus

Management

Abhängig vom Befund und Allgemeinzustand des Patienten

Antibiotikatherapie und dann:

- Repetitive Thorakozentese (therapeutisch und diagnostisch)??
- Thoraxdrainage (14Ch vs. 24Ch > früher 32Ch)
- Intrapleurale Fibrinolysetherapie (TPA, DNA-ase, Streptokinase)
- Operatives Vorgehen (Thorakoskopie, Thorakotomie mit Dekortikation und Pleurektomie, Thorakoplastik+/- VAC, Thorakostomie)

Enger interdisziplinärer Austausch zwischen Pneumologen und Thoraxchirugen für die optimale Behandlung entscheidend.

Antibiotische Empyemtherapie

Amoxicillin/Clavulansäure 2.2 g alle 8 h i.v.

Ceftriaxon 2 g alle 24 h und Metronidazol 500 mg alle 8 h

Ceftriaxon 2 g alle 24 h und Clindamycin 600 mg alle 8 h

Dauer/Umstellung auf p.o: 2-4 w je nach Verlauf und chirurgischem Prozedere

Intrapleurale Antibiotikatherapie bedeutungslos

Anpassung nach Erhalt der Resistenztestung

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Thoraxdrainage

In der frühen Phase empfohlen

Grösse und Art kontrovers diskutiert

Sonographisch- ggf. CT-gesteuert

Proaktive Ergussabklärung

CHEST Original Research
INTERVENTIONAL PULMONOLOGY

The Relationship Between Chest Tube Size and Clinical Outcome in Pleural Infection

Najib M. Rahman, BM, BCh; Nicholas A. Maskell, DM; Christopher W. H. Davies, MD; Emma L. Hedley; Andrew J. Nunn, MSc; Fergus V. Gleeson, MBBS; and Robert J. O. Davies, DM

Background: **The optimal choice of chest tube size for the treatment of pleural infection is unknown, with only small cohort studies reported describing the efficacy and adverse events of different tube sizes.**
Methods: **A total of 405 patients with pleural infection were prospectively enrolled into a multicenter study investigating the utility of fibrinolytic therapy. The combined frequency of death and surgery, and secondary outcomes (hospital stay, change in chest radiograph, and lung function at 3 months) were compared in patients receiving chest tubes of differing size (χ^2, *t* test, and logistic regression analyses as appropriate). Pain was studied in detail in 128 patients.**
Results: **There was no significant difference in the frequency with which patients either died or required thoracic surgery in patients receiving chest tubes of varying sizes (< 10F, number dying or needing surgery 21/58 [36%]; size 10-14F, 75/208 [36%]; size 15-20F, 28/70 [40%]; size > 20F, 30/69 [44%]; χ^2trend, 1 degrees of freedom [*df*] = 1.21, *P* = .27), nor any difference in any secondary outcome. Pain scores were substantially higher in patients receiving (mainly blunt dissection inserted) larger tubes (< 10F, median pain score 6 [range 4-7]; 10-14F, 5 [4-6]; 15-20F, 6 [5-7]; > 20F, 6 [6-8]; χ^2, 3 *df* = 10.80, *P* = .013, Kruskal-Wallis; χ^2trend, 1 *df* = 6.3, *P* = .014).**
Conclusions: **Smaller, guide-wire-inserted chest tubes cause substantially less pain than blunt-dissection-inserted larger tubes, without any impairment in clinical outcome in the treatment of pleural infection. These results suggest that smaller size tubes may be the initial treatment of choice for pleural infection, and randomized studies are now required.**
Trial registration: **MIST1 trial ISRCTN number: 39138989.** ***CHEST 2010; 137(3):536–543***

Abbreviations: *df* = degrees of freedom; IQR = interquartile range; MIST1 = Multi-center Intrapleural Streptokinase Trial; MPS = median pain score

Thoraxdrainage

Intrapleurale Fibrinolyse - Nutzen ebenfalls kontrovers, bei selektierten Patienten zu erwägen

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MIST2 - Multicenter Intrapleural Sepsis Trial 2 - Statistischer und klinischer Benefit

75% weniger Operationen

Bei fehlender klinischer und radiologischer Besserung ist eine operative Therapie zu evaluieren

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Intrapleural Use of Tissue Plasminogen Activator and DNase in Pleural Infection

Najib M. Rahman, D.Phil., Nicholas A. Maskell, D.M., Alex West, M.R.C.P., Richard Teoh, M.R.C.P., Anthony Arnold, M.R.C.P., Carolyn Mackinlay, M.R.C.P., Daniel Peckham, M.D., Chris W.H. Davies, M.D., Nabeel Ali, M.D., William Kinnear, M.D., Andrew Bentley, M.D., Brennan C. Kahan, M.Sc., John M. Wrightson, M.R.C.P., Helen E. Davies, M.R.C.P., Clare E. Hooper, M.R.C.P., Y.C. Gary Lee, Ph.D., Emma L. Hedley, Nicky Crosthwaite, R.G.N., Louise Choo, M.Sc., Emma J. Helm, F.R.C.R., Fergus V. Gleeson, M.D., Andrew J. Nunn, M.Sc., and Robert J.O. Davies, M.D.*

From the United Kingdom Clinical Research Collaboration Oxford Respiratory Trials Unit and Oxford Pleural Diseases Unit, Churchill Hospital (N.M.R., J.M.W., H.E.D., E.L.H., N.C., R.J.O.D.); National Institute for Health Research Oxford Biomedical Research Centre, University of Oxford (N.M.R., F.V.G., R.J.O.D.); and the Department of Radiology, Oxford Radcliffe National Health Service Trusts (E.J.H., F.V.G.) — all in Oxford; Academic Respiratory Unit, the Department of Clinical Sciences, Southmead Hospital, University of Bristol, Bristol (N.A.M., C.E.H.); Medway Maritime Hospital, Gillingham (A.W.); Castle Hill Hospital, Cottingham (R.T., A.A.); Great Western Hospital, Swindon (C.M.); St. James's Hospital, Leeds (D.P.); Royal Berkshire Hospital, Reading (C.W.H.D.); King's Mill Hospital (N.A.) and Queen's Medical Centre (W.K.) — both in Nottingham; Wythenshawe Hospital, Manchester (A.B.); and Medical Research Council Clinical Trials Unit, London (B.C.K., L.C., A.J.N.) — all in the United Kingdom; and School of Medicine and Centre for Asthma, Allergy and Respiratory Research, University of Western Australia, Perth (Y.C.G.L.). Address reprint requests to Dr. Rahman at UKCRC Oxford Respiratory Trials Unit, Oxford Centre for Respiratory Medicine, Nuffield Department of Medicine, University of Oxford, Churchill Hospital Site, Headington, Oxford OX3 7LJ, United Kingdom, or at najib.rahman@ndm.ox.ac.uk.

*Deceased.

N Engl J Med 2011;365:518-26.
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ABSTRACT

BACKGROUND

More than 30% of patients with pleural infection either die or require surgery. Drainage of infected fluid is key to successful treatment, but intrapleural fibrinolytic therapy did not improve outcomes in an earlier, large, randomized trial.

METHODS

We conducted a blinded, 2-by-2 factorial trial in which 210 patients with pleural infection were randomly assigned to receive one of four study treatments for 3 days: double placebo, intrapleural tissue plasminogen activator (t-PA) and DNase, t-PA and placebo, or DNase and placebo. The primary outcome was the change in pleural opacity, measured as the percentage of the hemithorax occupied by effusion, on chest radiography on day 7 as compared with day 1. Secondary outcomes included referral for surgery, duration of hospital stay, and adverse events.

RESULTS

The mean (±SD) change in pleural opacity was greater in the t-PA–DNase group than in the placebo group (−29.5±23.3% vs. −17.2±19.6%; difference, −7.9%; 95% confidence interval [CI], −13.4 to −2.4; P=0.005); the change observed with t-PA alone and with DNase alone (−17.2±24.3 and −14.7±16.4%, respectively) was not significantly different from that observed with placebo. The frequency of surgical referral at 3 months was lower in the t-PA–DNase group than in the placebo group (2 of 48 patients [4%] vs. 8 of 51 patients [16%]; odds ratio for surgical referral, 0.17; 95% CI, 0.03 to 0.87; P=0.03) but was greater in the DNase group (18 of 46 patients [39%]) than in the placebo group (odds ratio, 3.56; 95% CI, 1.30 to 9.75; P=0.01). Combined t-PA–DNase therapy was associated with a reduction in the hospital stay, as compared with placebo (difference, −6.7 days; 95% CI, −12.0 to −1.9; P=0.006); the hospital stay with either agent alone was not significantly different from that with placebo. The frequency of adverse events did not differ significantly among the groups.

CONCLUSIONS

Intrapleural t-PA–DNase therapy improved fluid drainage in patients with pleural infection and reduced the frequency of surgical referral and the duration of the hospital stay. Treatment with DNase alone or t-PA alone was ineffective. (Funded by an unrestricted educational grant to the University of Oxford from Roche UK and by others; Current Controlled Trials number, ISRCTN57454527.)

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Thorakoskopie

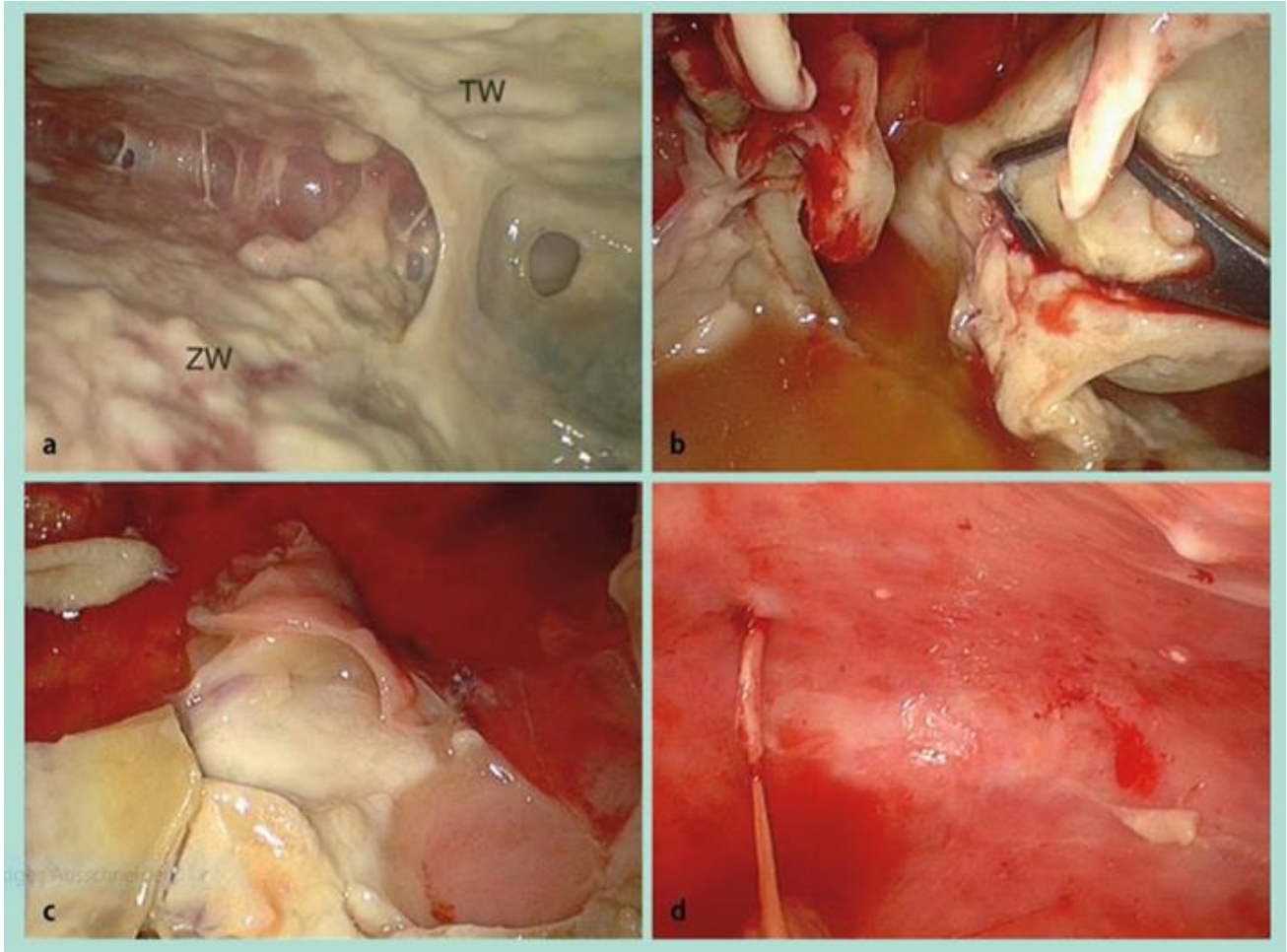
Therapie der 1. Wahl im Stadium II AATS 2015 Guidelines for Management of Empyema

Sicher und effektiv in kompliziertem parapneumonischem Empyem > Verkürzung der Heilungsphase und des stationären Aufenthaltes

Vorteilshaft in der Frühdekortikation

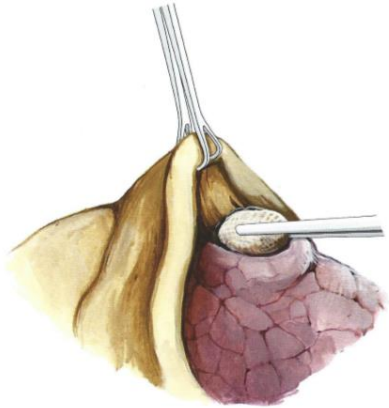
Lösung der fibrinösen Septen und Verwachsungen, Absaugen des Ergusses, Platzierung der Drainage(n) unter Sicht

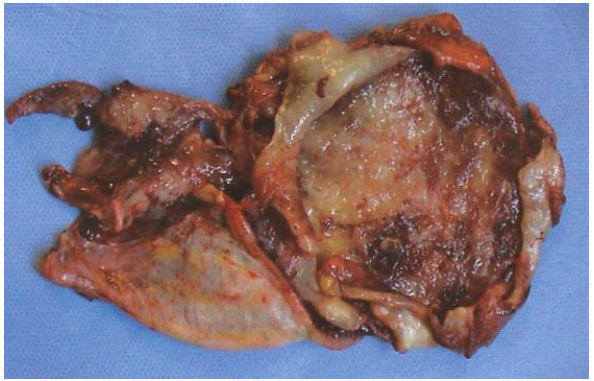
Dekortikation bei unvollständiger Lungenentfaltung


TW
ZW
a
b
c
d

Thorakotomie

- Dekortikation zur vollständigen Lungenreexpansion
- Vermeidung pleuraler Resthöhle > Reempyem
- Adäquate Drainagetherapie





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Postpneumonektomie Empyem

Vorliegen einer Bronchusstumpfinsuffizienz ?

Repetitives Debridement der Empyemhöhle alle 48 Stunden

Einlage und Wechsel von Antibiotika-getränkten Tücher

DAB-Lösung: 500mg Neomycin, 100mg Polymyxin B, 80mg Gentamycin

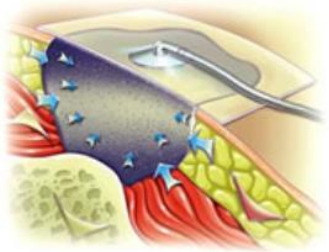
Definitiver Wundverschluss mit Auffüllen der Pleurahöhle

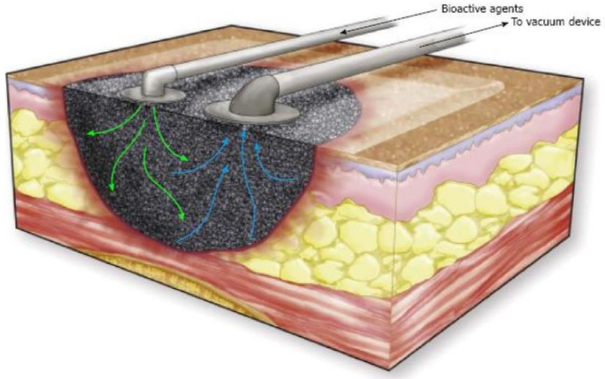
Clagett OT, Geraci JE. A procedure for the management of postpneumonectomy empyema. J Thorac Cardiovasc Surg 1963;45:141–5.

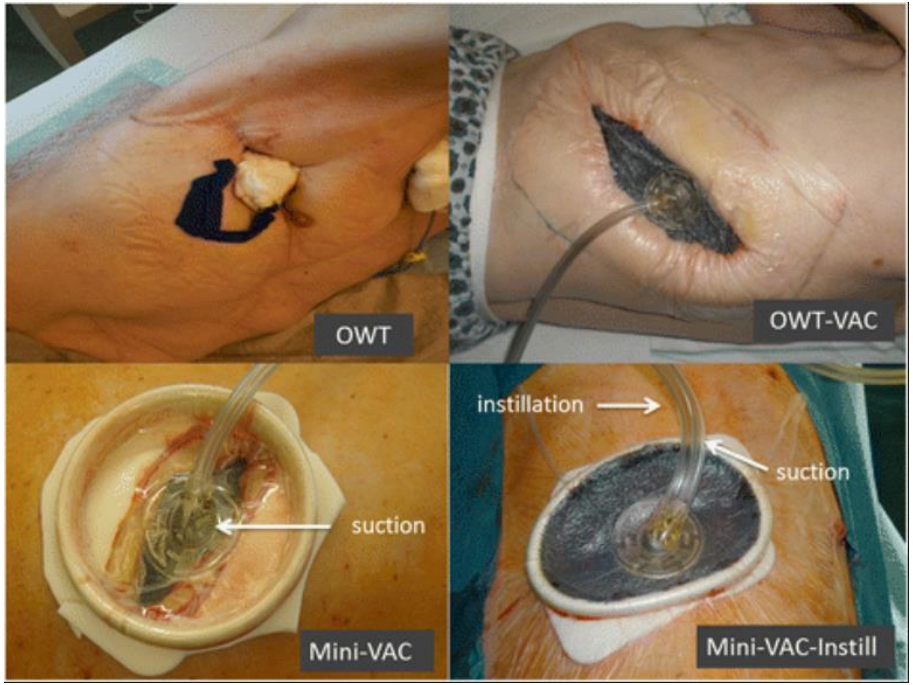
Modifizierte «Clagett Prozedur» Verstärkung des Bronchusstumpfes durch Transposition eines extrathorakalen Muskels

Pairolero PC, Arnold PG, Trastek VF, et al. Postpneumonectomy empyema. The role of intrathoracic muscle transposition. J Thorac Cardiovasc Surg 1990;99:958–68.

Intrathorakale Vakuum-Therapie



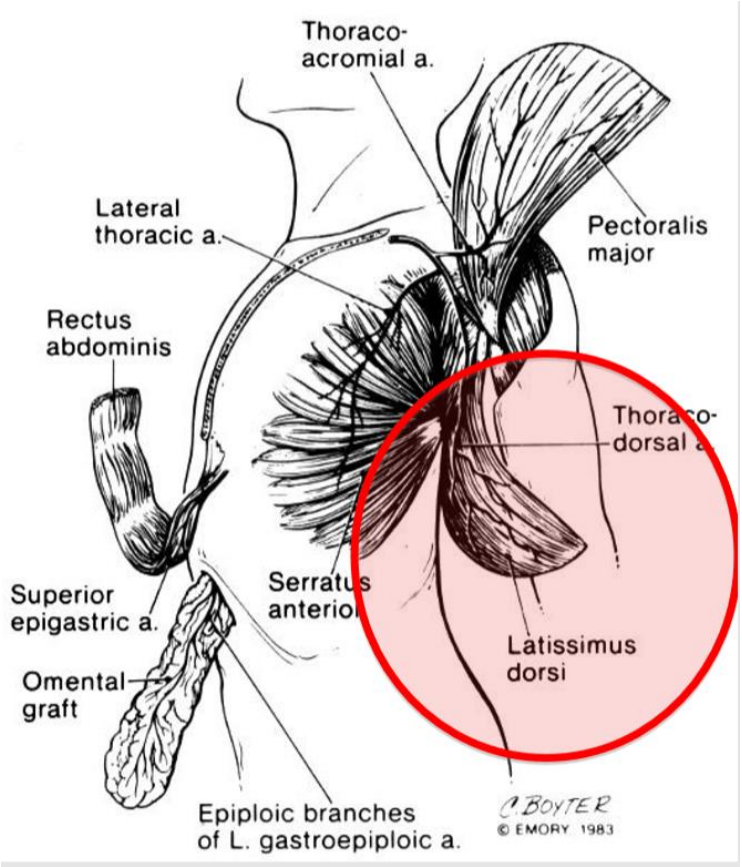




Myoplastik

- Muskelplombe:
  - M. latissimus dorsi
  - M. pectorialis major
  - M. serratus ant.
  - Mm. Intercostales
  - M. rectus abd.

- Omentumplombe



Thorakostomie

Ultima Ratio

Chronische Infektion, maligne Grunderkrankung, gefangene Lunge, Postpneumonektomie

Teilresektion von 2 Rippen

Pleurocutane Naht

Prä- und Postoperativ

- Mangelernährung erkennen und behandeln
- Adäquate Schmerztherapie
- Physiotherapie
  - Atemtherapie

Kompetent
Umfassend
Nah

Herzlichen Dank
für Ihre Aufmerksamkeit

Haben Sie Fragen?