Ο ασθενής με συμπτωματικό αυτόματο πνευμοθώρακα πρέπει να νοσηλεύεται;

Κατά

Χαράλαμπος Γ. Βαρσαμάς MD, PhD

Επ. Επιμελητής Β Πνευμονολογικής Κλινικής ΠΓΝΛ

ΣΥΜΠΤΩΜΑΤΙΚΟΣ ΠΝΕΥΜΟΘΩΡΑΚΑΣ

- Οξύ θωρακικό άλγος πλευριτικού τύπου

- Δύσπνοια

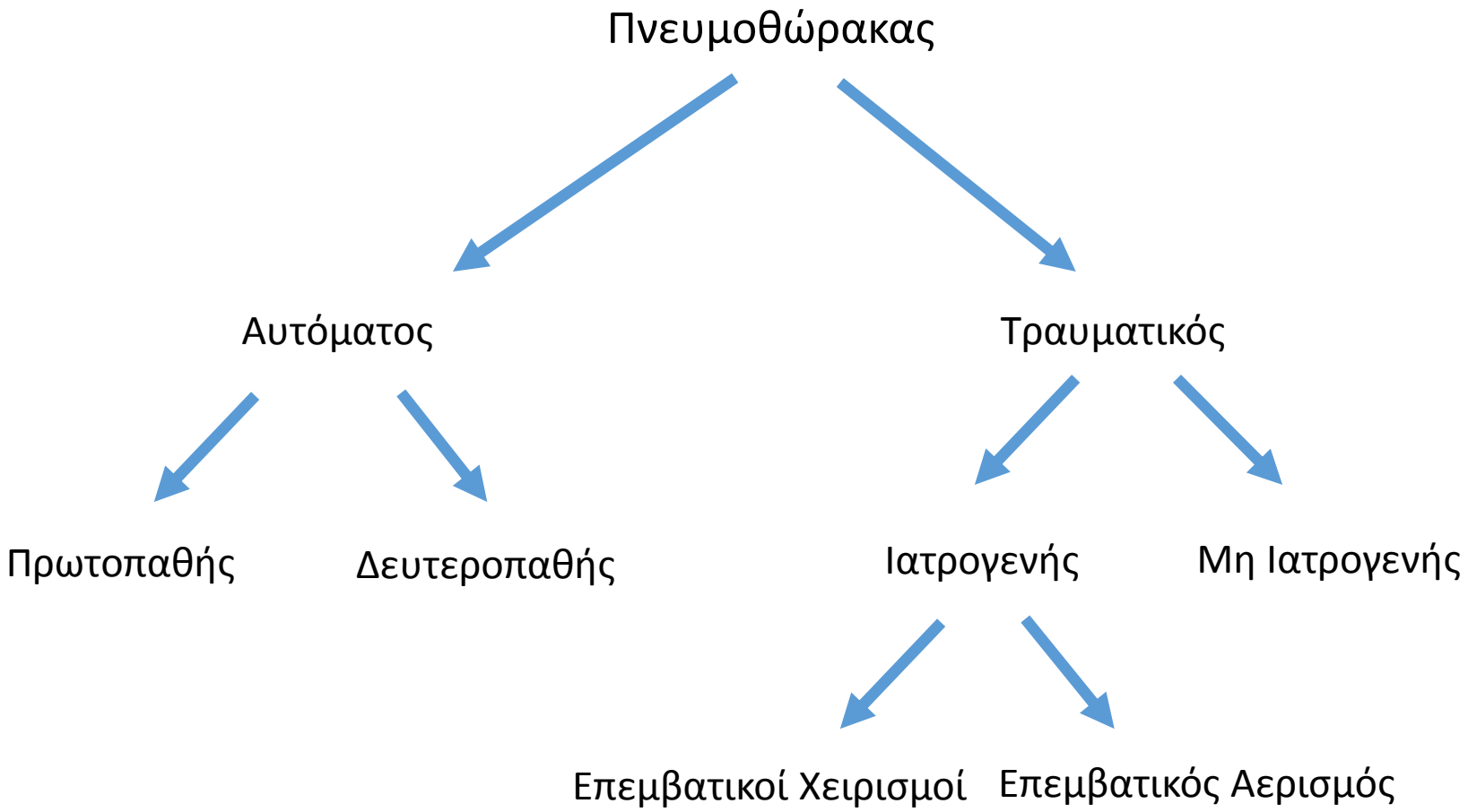
In defining a management strategy, the size of a pneumothorax is less important than the degree of clinical compromise. (D)

MacDuff A. et al, *Thorax* 2010

Within the current British Thoracic Society (BTS) guidelines (from 2010), there is a significant emphasis on a conservative approach to treatment [6] with management predominantly based on clinical symptoms.

Tschopp J-M et al, *ERJ* 2015

ΤΑΞΙΝΟΜΗΣΗ ΠΝΕΥΜΟΘΩΡΑΚΑ



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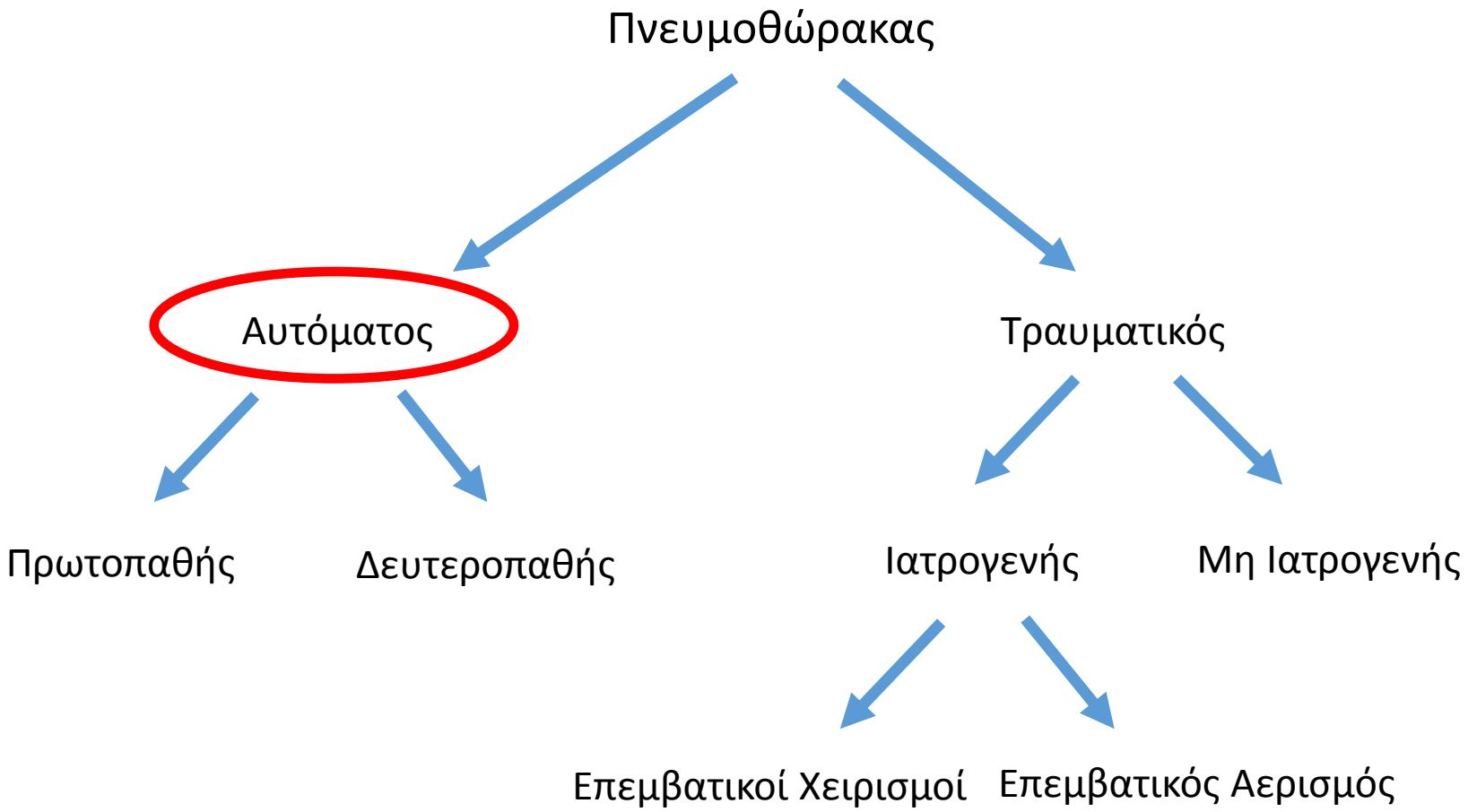
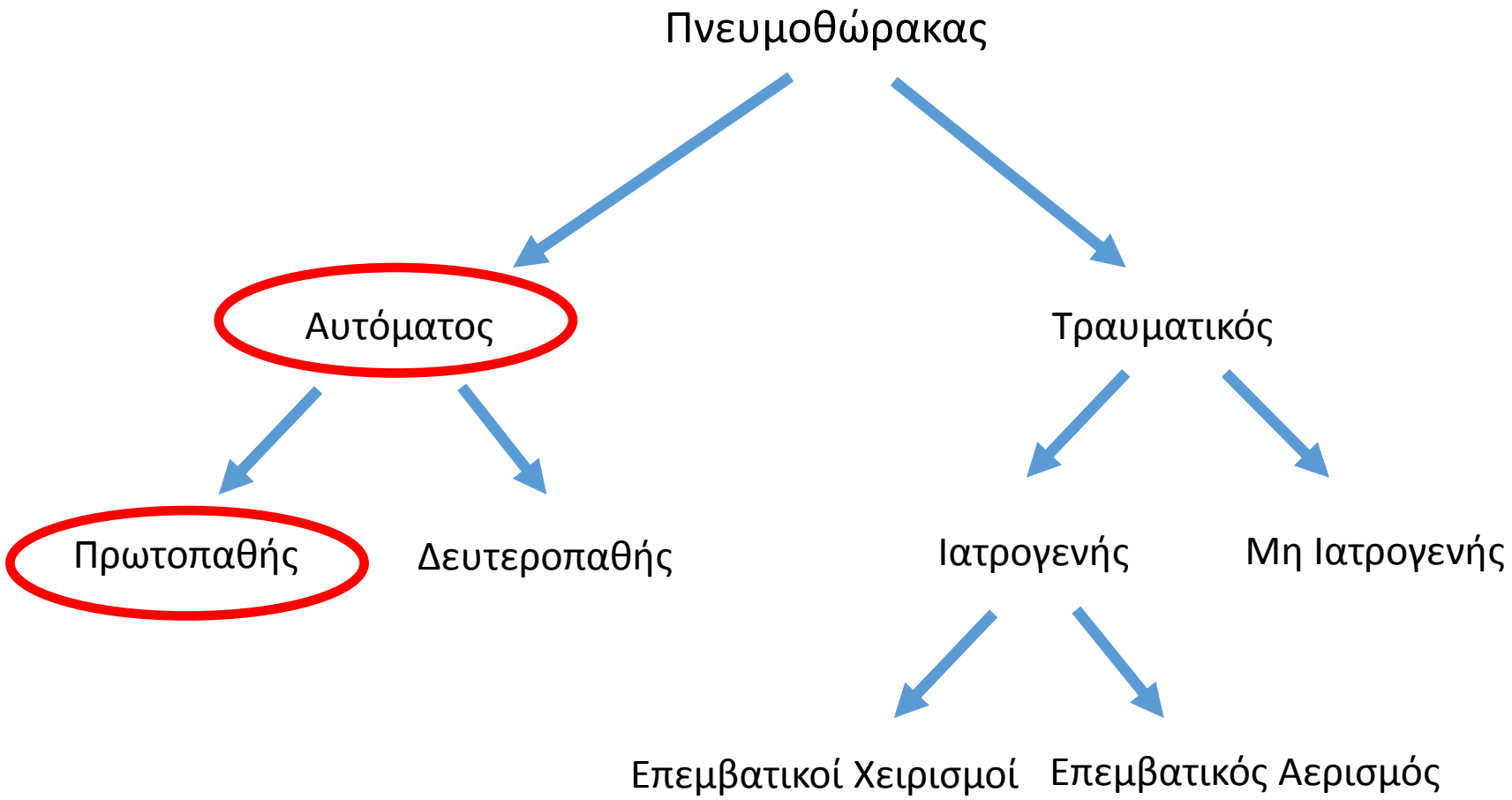


ΤΑΞΙΝΟΜΗΣΗ ΠΝΕΥΜΟΘΩΡΑΚΑ



ΣΤΟΧΟΣ ΤΗΣ ΘΕΡΑΠΕΙΑΣ…

- Η απομάκρυνση του αέρα από την υπεζωκοτική κοιλότητα
- Η πρόληψη πιθανών υποτροπών

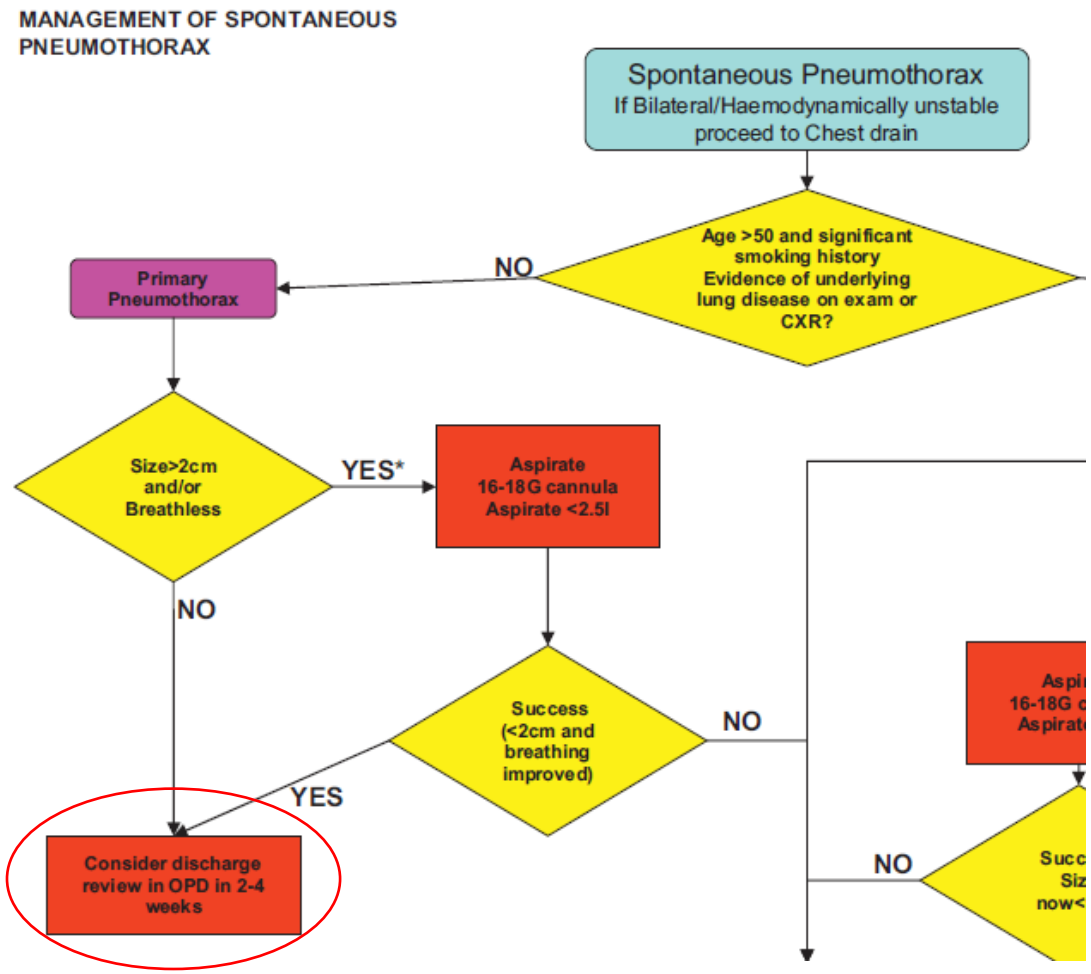
Plojoux J. et al, *Clin Respir J.* 2019

Η ΣΗΜΕΡΙΝΗ ΠΡΑΚΤΙΚΗ ΣΤΟ ΝΟΣΟΚΟΜΕΙΟ ΜΑΣ…

- Ασυμπτωματικός, μικρός αυτόματος πνευμοθώρακας → Εισαγωγή
  Παρακολούθηση ±
  χορήγηση οξυγονοθεραπείας

- Συμπτωματικός ή μεγάλος αυτόματος πνευμοθώρακας → Εισαγωγή
  Τοποθέτηση θωρακοσωλήνα ±
  χορήγηση οξυγονοθεραπείας
  ± αναρρόφηση

ΑΝΑΦΟΡΕΣ ΣΤΑ GUIDELINES…



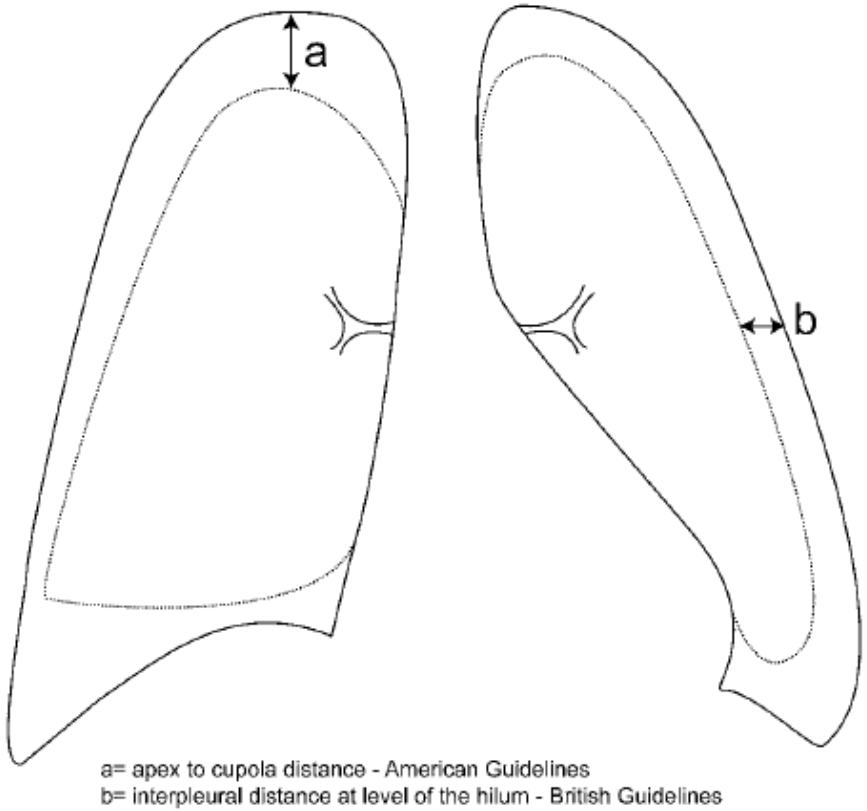


Figure 1 Depth of pneumothorax.

insertion is usually employed. Following successful NA, the patient can be considered for hospital discharge.

spontaneous pneumothorax. Following aspiration, patients may be discharged, avoiding hospital admission, although insertion of a small-bore chest tube attached to a Heimlich valve may yield similar

MacDuff A. et al, *Thorax* 2010

Tschopp J-M et al, *ERJ* 2015

ΑΝΑΦΟΡΕΣ ΣΤΑ GUIDELINES…

Clinically Stable Patients With Large Pneumothoraces: Clinically stable patients with large pneumothoraces should undergo a procedure to reexpand the lung and should be hospitalized in most instances (very good consensus). The lung should be reex-

Reliable patients who are unwilling to undergo hospitalization may be discharged home from the emergency department with a small-bore catheter attached to a Heimlich valve if the lung has reexpanded after the removal of pleural air (good consensus). Follow-up should be arranged within 2 days.

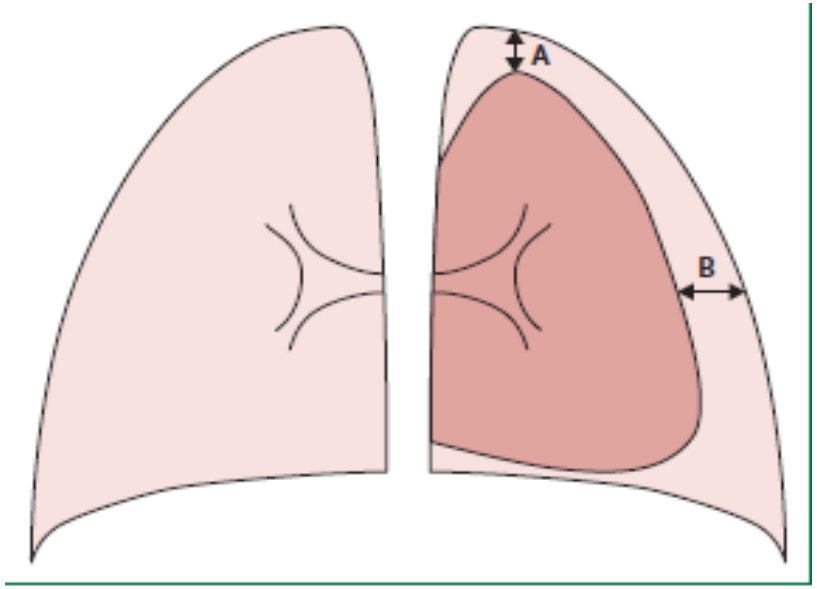


Figure 2: Size classification of pneumothorax
(A) The American College of Chest Physicians (2001) defines the size of a pneumothorax by the apex to cupola distance (≥3 cm large; <3 cm small).[35]
(B) The British Thoracic Society (2010) defines the size of a pneumothorax by the interpleural distance measured at the hilum (≥2 cm large; <2 cm small).[35]

Baumann MH et al, *Chest* 2001

Η ΓΟΗΤΕΙΑ ΤΗΣ ΜΗ ΝΟΣΗΛΕΙΑΣ…

- Οι ασθενείς με πρωτοπαθή αυτόματο πνευμοθώρακα είναι νέοι με λίγες ή καθόλου συννοσηρότητες

- Ο πρωτοπαθής αυτόματος πνευμοθώρακας είναι μια νόσος με μικρή θνησιμότητα και θνητότητα

Gupta D et al, *Thorax* 2000

- Πιθανά οικονομικά οφέλη

- Περισσότερες διαθέσιμες κλίνες

Brims et al, *Thorax* 2013

Η ΓΟΗΤΕΙΑ ΤΗΣ ΜΗ ΝΟΣΗΛΕΙΑΣ… ΜΙΑ ΚΑΙΝΟΥΡΙΑ ΙΔΕΑ;

Outpatient Management of Intercostal Tube Drainage in Spontaneous Pneumothorax

C. Mercier, M.D., A. Pagé, M.D., A. Verdant, M.D., R. Cossette, M.D., L. Dontigny, M.D., and L. C. Pelletier, M.D.

"The outpatient management was safe, efficient and economical"

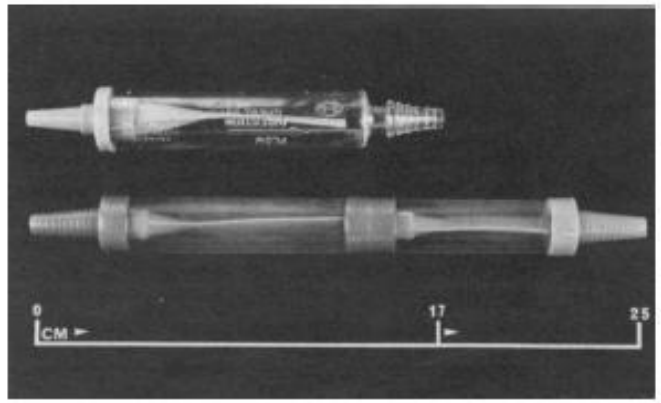
Definitive Treatment of Spontaneous Pneumothorax in 226 Patients

Treatment	No. of Patients
Outpatient management	
Conservative	45
Chest tube & valve	122
Total	167 (74%)
In-hospital management	
Nonsurgical	17
Surgical	42
Total	59 (26%)

being 12 years of age and the oldest, 66 years. At their initial visit it was the first episode of spontaneous pneumothorax for 174 patients (77%), the second episode for 30 patients, and the third episode or more for the remaining 22 patients.

When incomplete lung reexpansion or an air leak persisted for seven days or more, the patient was hospitalized and underwater drainage

Patients with multiple recurrences, a third episode on one side, or a second episode on the contralateral side were also hospitalized and op-



The disposable flutter valves: Heimlich (above) *and Vycon* (below).

DR. HENRY J. HEIMLICH (Cincinnati, OH):

reported. As a result of the hundreds of lives the valves are credited with saving in the wars in Vietnam and Israel, they have become recognized as an emergency item. Their primary use, however, con-

Mercier C et al, *Ann Thorac Surg* 1976

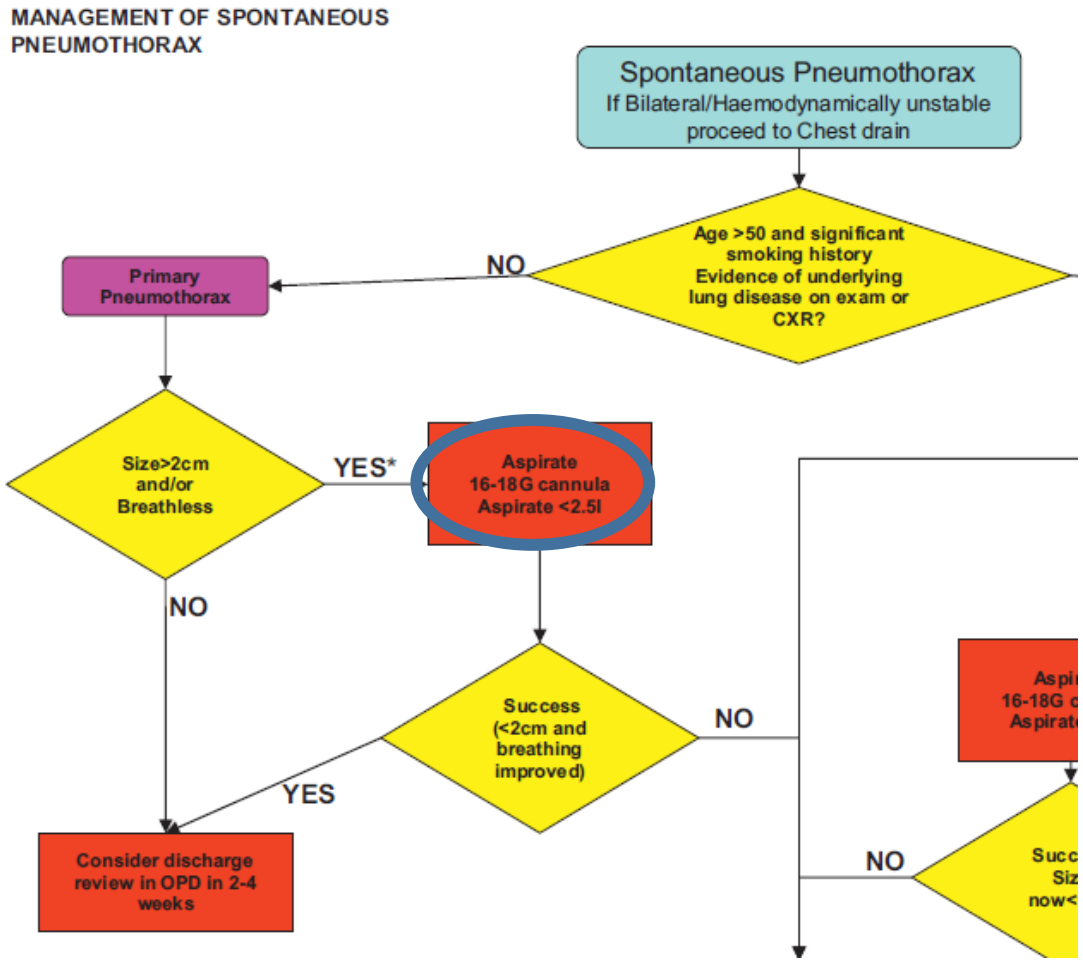
ΣΤΟΧΟΣ ΤΗΣ ΘΕΡΑΠΕΙΑΣ…

- Η απομάκρυνση του αέρα από την υπεζωκοτική κοιλότητα
- Η πρόληψη πιθανών υποτροπών

Plojoux J. et al, *Clin Respir J.* 2019

ΥΠΑΡΧΕΙ ΖΩΗ ΠΕΡΑ ΑΠΟ ΤΟ ΘΩΡΑΚΟΣΩΛΗΝΑ;…

Needle Aspiration (NA)



Needle Aspiration of Pneumothorax by the NEJM online video, NEJM web page

Needle (14–16 G) aspiration (NA) is as effective as large-bore (>20 F) chest drains and may be associated with reduced hospitalisation and length of stay. (A)

NA should not be repeated unless there were technical difficulties. (B)

MacDuff A. et al, *Thorax* 2010

results [99, 100]. It should be noted that failure with aspiration occurs at a frequency of 25–50% in PSP [9, 101] and that after a failed aspiration there is no evidence to support a second aspiration over chest drain insertion.

Tschopp J-M et al, *ERJ* 2015

ΥΠΑΡΧΕΙ ΖΩΗ ΠΕΡΑ ΑΠΟ ΤΟ ΘΩΡΑΚΟΣΩΛΗΝΑ;…

Needle Aspiration (NA)

TABLE 2 Randomised studies of aspiration *versus* thoracic drainage for initial treatment of spontaneous pneumothorax

First author [ref.]	Year	Patients n	Outcome	Aspiration	Chest drain	Difference
Harvey [94]	1994	73	Success	80	100	ND
			Hospital stay days	3.2	5.3	p=0.005
			Recurrence at 1 year	17	29	NS
Andrivet [95]	1995	61	Success	67	93	p=0.01
			Hospital stay days	7	7	NS
			Recurrence at 3 months	14	29	NS
Noppen [96]	2002	60	Immediate success	59	64	NS
			Admissions	52	100	p<0.0001
			Success at 1 week	93	85	NS
			Recurrence at 1 year	26	27	NS
Ayed [97]	2006	137	Immediate success	62	68	NS
			Success at 1 week	89	88	NS
			Recurrence at 1 year	22	24	NS
Parlak# [98]	2012	56	Immediate success	68	81	NS
			Success at 2 weeks	100	100	NS
			Recurrence at 1 year	4	13	NS

Data are presented as percentages, unless otherwise stated. ND: not done; NS: nonsignificant. #: includes traumatic pneumothorax.

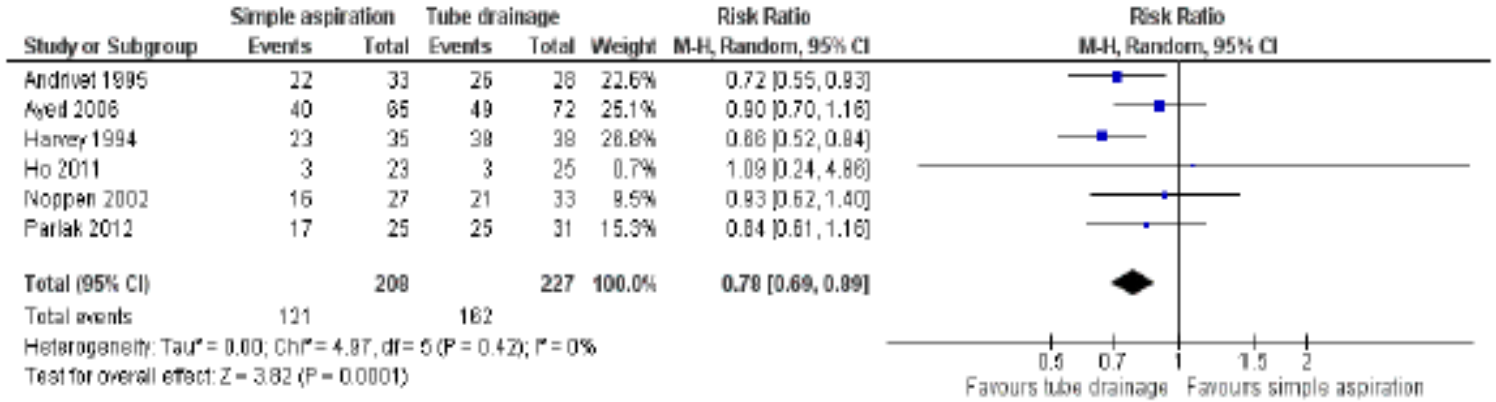
From this table, the evidence suggests that needle aspiration is effective for the initial management of spontaneous pneumothorax. Following aspiration, patients may be discharged, avoiding hospital admission, although insertion of a small-bore chest tube attached to a Heimlich valve may yield similar

Tschopp J-M et al, *ERJ* 2015

ΥΠΑΡΧΕΙ ΖΩΗ ΠΕΡΑ ΑΠΟ ΤΟ ΘΩΡΑΚΟΣΩΛΗΝΑ;…

- Needle Aspiration

Simple aspiration versus intercostal tube drainage for primary spontaneous pneumothorax in adults (Review)



Study or Subgroup	Simple aspiration Events	Total	Tube drainage Events	Total	Weight	Risk Ratio M-H, Random, 95% CI
Andrivet 1995	22	33	25	28	22.6%	0.72 [0.55, 0.93]
Ayed 2006	40	65	49	72	25.1%	0.90 [0.70, 1.16]
Harvey 1994	23	35	38	38	26.8%	0.66 [0.52, 0.84]
Ho 2011	3	23	3	25	0.7%	1.09 [0.24, 4.86]
Noppen 2002	16	27	21	33	9.5%	0.93 [0.62, 1.40]
Parlak 2012	17	25	25	31	15.3%	0.84 [0.61, 1.16]
Total (95% CI)		**208**		**227**	**100.0%**	**0.78 [0.69, 0.89]**
Total events	121		162			

Heterogeneity: Tau² = 0.00; Chi² = 4.87, df = 5 (P = 0.43); I² = 0%
Test for overall effect: Z = 3.82 (P = 0.0001)

The six included trials demonstrated significant improvement in the immediate success rate for tube drainage compared with simple aspiration. Simple aspiration on the contrary led to fewer adverse events and a shorter duration of hospitalization. Furthermore, re-

ple aspiration to treat individuals with PSP. These results must be placed in the context of the quality of evidence provided, which ranged from very low to moderate.

Kristin V Carson-Chahhoud, *Cochrane Database Syst Rev*. 2017

ΥΠΑΡΧΕΙ ΖΩΗ ΠΕΡΑ ΑΠΟ ΤΟ ΘΩΡΑΚΟΣΩΛΗΝΑ;…

Needle Aspiration

Randomised comparison of needle aspiration and chest tube drainage in spontaneous pneumothorax

A. Thelle[1], M. Gjerdevik[2,3,4], M. SueChu[5,6], O. M. Hagen[7] and P. Bakke[8]

	Needle aspiration	Chest tube drainage	p-value
All patients (n=127)			
Hospital stay days	2.4 (1.2–4.7)	4.6 (2.3–7.8)	<0.001
Immediate success	44 (68.8)	20 (31.8)	<0.001
One-week success	52 (81.3)	45 (71.4)	0.193
Patients with primary SP (n=79)			
Hospital stay days	2.2 (1.2–4.5)	4.1 (2.2–5.9)	0.008
Immediate success	31 (73.8)	14 (37.8)	0.001
One-week success	36 (85.7)	29 (78.4)	0.394
Patients with secondary SP (n=48)			
Hospital stay days	2.5 (1.2–7.8)	5.5 (3.6–9.2)	0.049
Immediate success	13 (59.1)	6 (23.1)	0.011
One-week success	16 (72.7)	16 (61.5)	0.413
Patients with first episode (n=80[#])			
Hospital stay days	2.3 (1.2–4.7)	4.5 (2.2–7.5)	0.006
Immediate success	25 (65.8)	14 (33.3)	0.004
One-week success	32 (84.2)	30 (71.4)	0.172
Patients with recurrent episode (n=33)			
Hospital stay days	3.3 (2.3–7.8)	5.4 (3.9–11.4)	0.150
Immediate success	11 (64.7)	3 (18.8)	0.008
One-week success	11 (64.7)	11 (68.8)	0.805

Thelle A et al, *ERJ* 2017

were observed when the analysis was limited to SSP. All the procedures were performed by junior doctors on call which is another strength of this study, as it better reproduces routine clinical practice. If these results are confirmed by further tri-

as suggested by Walker et al.[43] Taken together, these data strongly suggest that simple NA is a valuable alternative to CTD in case of PSP requiring air evacuation for symptomatic patients.

Plojoux J. et al, *Clin Respir J.* 2019

More recently, Thelle et al conducted another similar RCT enrolling both PSP ($n = 79$) and SSP ($n = 48$) patients.[43] They found NA to be more effective than chest tube drainage for initial treatment success (68.8% vs. 31.8%), although 37.5% (24/36) required a second aspiration.[43] NA remained significantly different when analyzing PSP (73.8% vs. 37.8%) and SSP separately (59.1% vs. 23.1%). This is the first study to specifically include sufficient numbers of patients with SSP to report the results separately. The authors suggest that the guidelines should be changed to treat SSP in the same way as PSP (i.e., with NA initially).[43] However, the low success rate of the chest tube drainage in all patient groups (31.8%) should be noted.

Hallifax R et al, *Semin Respir Crit Care Med* 2019

ΥΠΑΡΧΕΙ ΖΩΗ ΠΕΡΑ ΑΠΟ ΤΟ ΘΩΡΑΚΟΣΩΛΗΝΑ;…

- Βαλβίδες Heimlich (Τεχνική Seldinger)

and the ease of insertion of small-bore (<14 F) Seldinger chest drains may be regarded as a simpler option to NA. Their success has been documented in several studies,[83–89] the attachment of Heimlich valves facilitating mobilisation and outpatient care. Small-bore chest drains have been shown to have a similar success rate to larger drains[90] while being less painful,[91 92] but

MacDuff A. et al, *Thorax* 2010

Reliable patients who are unwilling to undergo hospitalization may be discharged home from the emergency department with a small-bore catheter attached to a Heimlich valve if the lung has reexpanded after the removal of pleural air (good consensus). Follow-up should be arranged within 2 days.

Baumann MH et al, *Chest* 2001

Massongo M et al, *ERJ* 2014

ΥΠΑΡΧΕΙ ΖΩΗ ΠΕΡΑ ΑΠΟ ΤΟ ΘΩΡΑΚΟΣΩΛΗΝΑ;...

- Βαλβίδες Heimlich (Τεχνική Seldinger)

ORIGINAL ARTICLE

Ambulatory treatment in the management of pneumothorax: a systematic review of the literature

Fraser John H Brims,[1,2] Nick A Maskell[3]

more than a thousand other reported cases. Despite mixed methodology and a high risk of reporting bias, there is enough data to support the notion that HV might be useful in the treatment of non-traumatic pneumothorax with reasonable treatment success on varied parameters in the studies assessed. This

The use of a HV attached to a secure intercostal catheter would potentially facilitate ambulatory treatment of pneumothorax and plausibly, in selected individuals' OP-based care. Indeed this management option has been attempted in the vast majority of cases we have identified, with reported success in 761/977 (77.9%; 95% CI 75.2 to 80.4). Strategy varied widely

the ICT and HV. Nevertheless, given the young age group, minimal comorbidity and low mortality associated with PSP,[5] there is now persuasive evidence to support further research as to the usability and safety of this approach.

Table 1 Summary and characteristics of studies included

Authors	Year	Study design	Outcome	Intervention n=	Pneumothorax type	Exclusions	Setting	Quality
Ho *et al*	2011	RCT	Need for second procedure	25 (23 controls)	PSP	Tension pneumothorax, trauma, pleural effusions, SSP, bleeding disorders	Single centre. Singapore	Very good
Roeggla *et al*	1996	RCT	Need for second procedure	19 (13 controls)	SP—not defined	None stated	Single centre. Austria	Moderate
Vallee *et al*	1988	Prospective series	Re-expansion	37	PSP (19), SSP (18)	Need for mechanical ventilation, hydrothorax, tension pneumothorax	Single centre. USA	Good
Marquette *et al*	2006	Prospective consecutive cases	Re-expansion	41	PSP	Previous pneumothorax	Single centre. France	Good
Dernevik *et al*	2003	Prospective series	Treatment as outpatient	55	PSP (35), SSP (20)	None stated	Single centre. Sweden	Moderate
Lai *et al*	2012	Retrospective case-note review	Need for second procedure	55	PSP	Tension pneumothorax	Single centre. Singapore	Poor
Ponn *et al*	1997	Retrospective series	Treatment as outpatient	240	PSP (96), SSP (80)	Pleural effusion, pleural infection	Single centre. USA	Poor
Hassani *et al*	2009	Retrospective case series	Re-expansion	62	PSP	SSP, IP, postsurgery, traumatic, tension pneumothorax, effusion	Single centre. Canada	Moderate
Campisi *et al*	1997	Retrospective case series	Treatment as outpatient	14	PSP (13), SSP (1)	None stated	Single centre. USA	Poor
Cannon *et al*	1981	Retrospective series	Treatment as outpatient	41	PSP (34), IP (7)	None stated	Single centre. USA	Poor
Mercier *et al*	1976	Case series	Treatment as outpatient	226	PSP (174), SSP (52)	None stated	Single centre. Canada	Poor
Page *et al*	1975	Retrospective case series	Treatment as outpatient	104	PSP	None stated	Single centre. Canada	Poor
Conces *et al*	1988	Retrospective case	Re-expansion	84	PSP (14), IP (66)	None stated	Single centre.	Poor
Bernstein *et al*	19							
Minami *et al*	19							
Martin *et al*	19							
Choi *et al*	20							
Gupta *et al*	20							

Intervention, use
pneumothorax; SS

Table 3 Reported complications from all studies (n=1235)

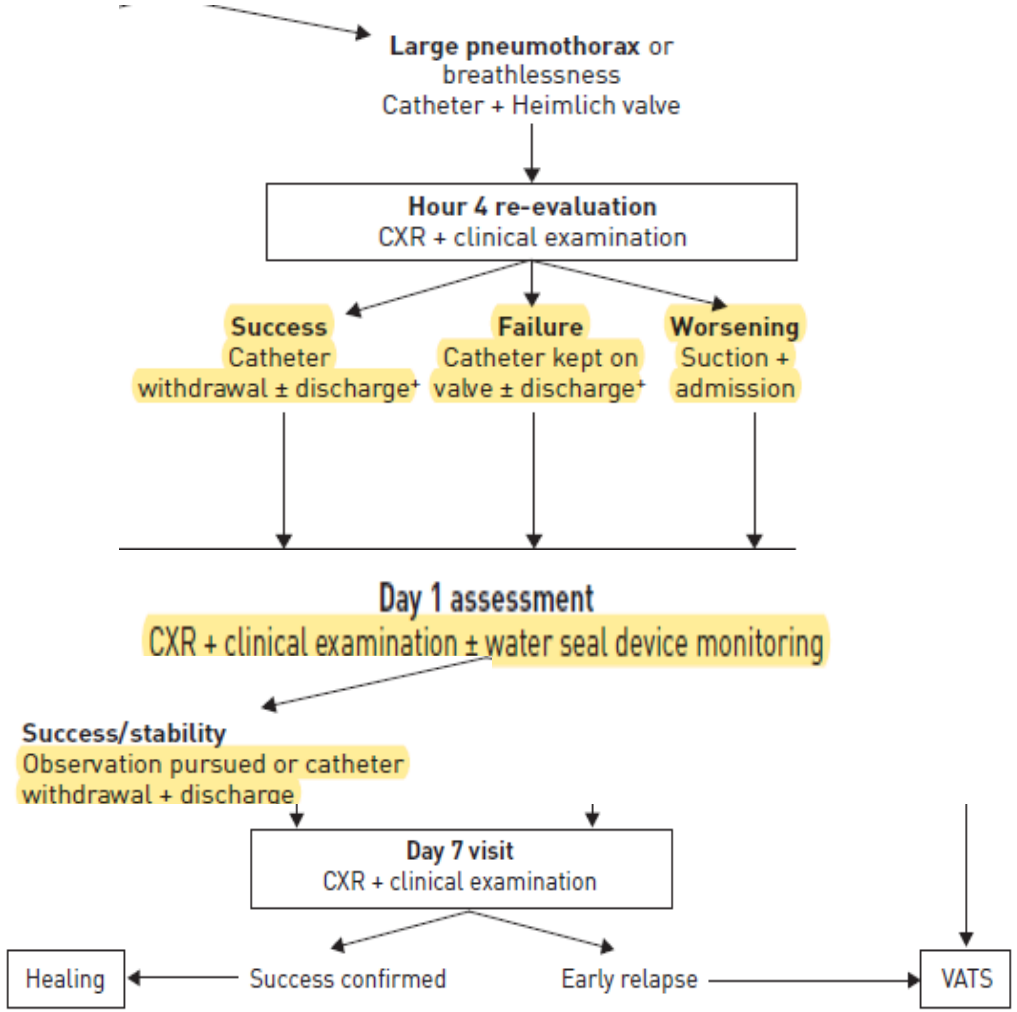
Complication	n=
Death	0
Visceral puncture/injury	0
Haemothorax (all managed conservatively)	4
Incorrect connection—tension pneumothorax	1
Local cellulitis	1
Tube blockage with exudate	2
HV/catheter dislodged	8
Pain after insertion	1
Surgical emphysema	4

HV, Heimlich valve.

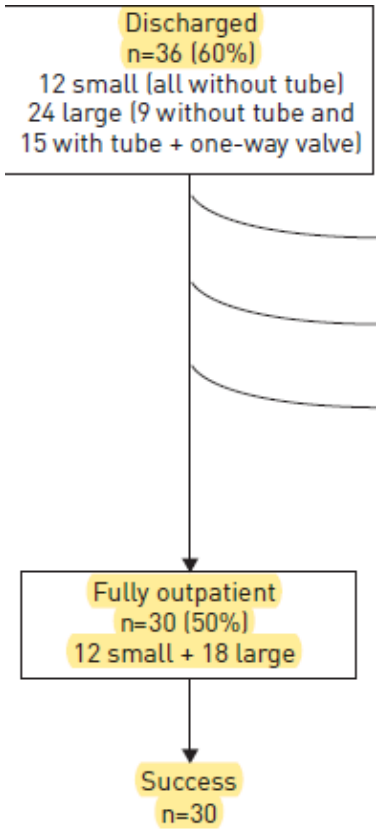
Brims F et al, *Thorax* 2013

ΥΠΑΡΧΕΙ ΖΩΗ ΠΕΡΑ ΑΠΟ ΤΟ ΘΩΡΑΚΟΣΩΛΗΝΑ;…

- Βαλβίδες Heimlich (Τεχνική Seldinger)



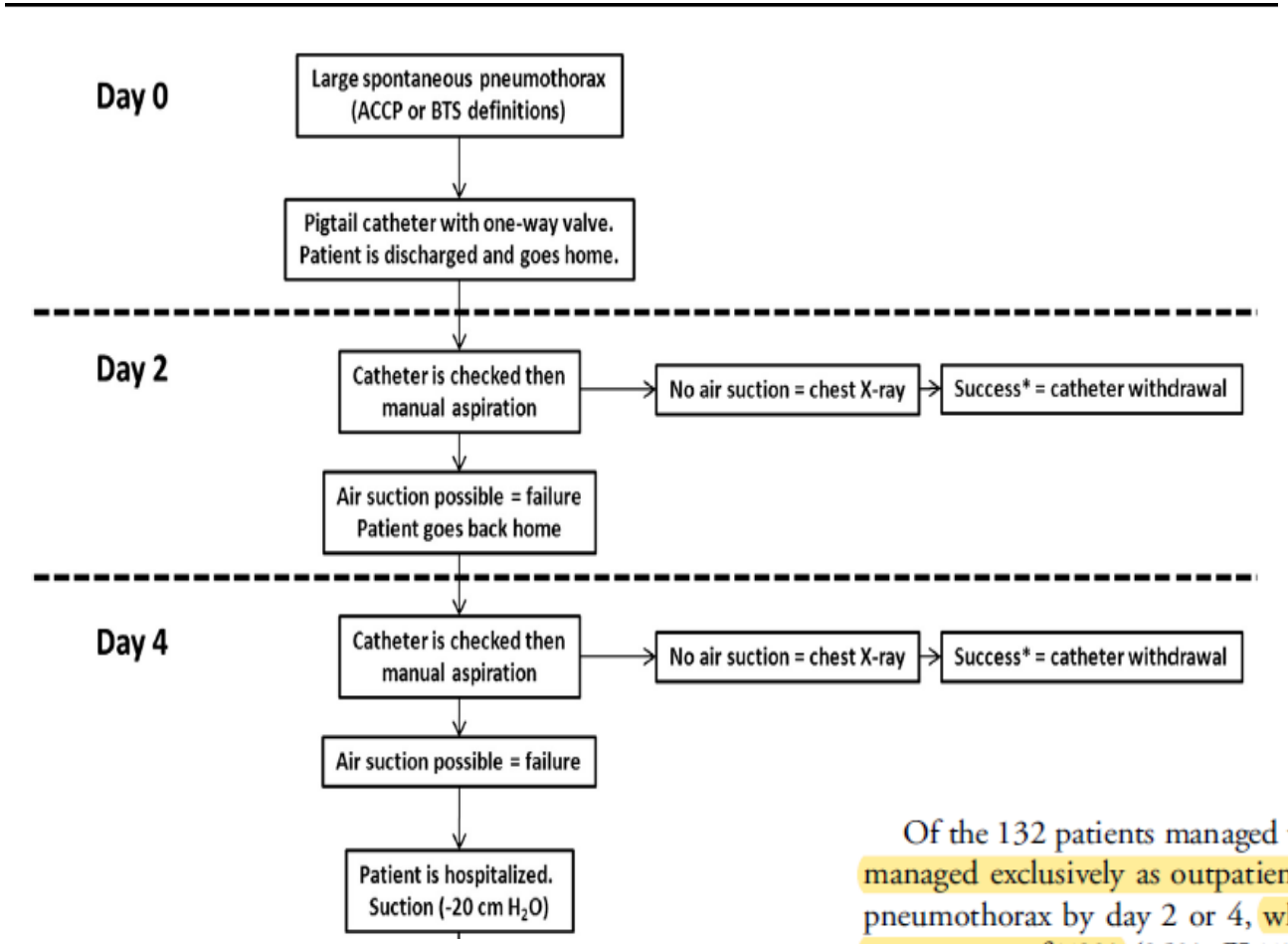
the pulmonary ward; and 4) follow-up. Discharge safety criteria included: 1) patient in stable condition; 2) time to reach the hospital from patient's home <1 h by any means of transport; 3) patient not living alone; 4) patient able to understand and implement instructions given in case of problem; and 5) time of discharge before 20:00 h. This latter criterion was chosen since, realistically, it seemed unreasonable to discharge a patient at night, within minutes of pneumothorax treatment.

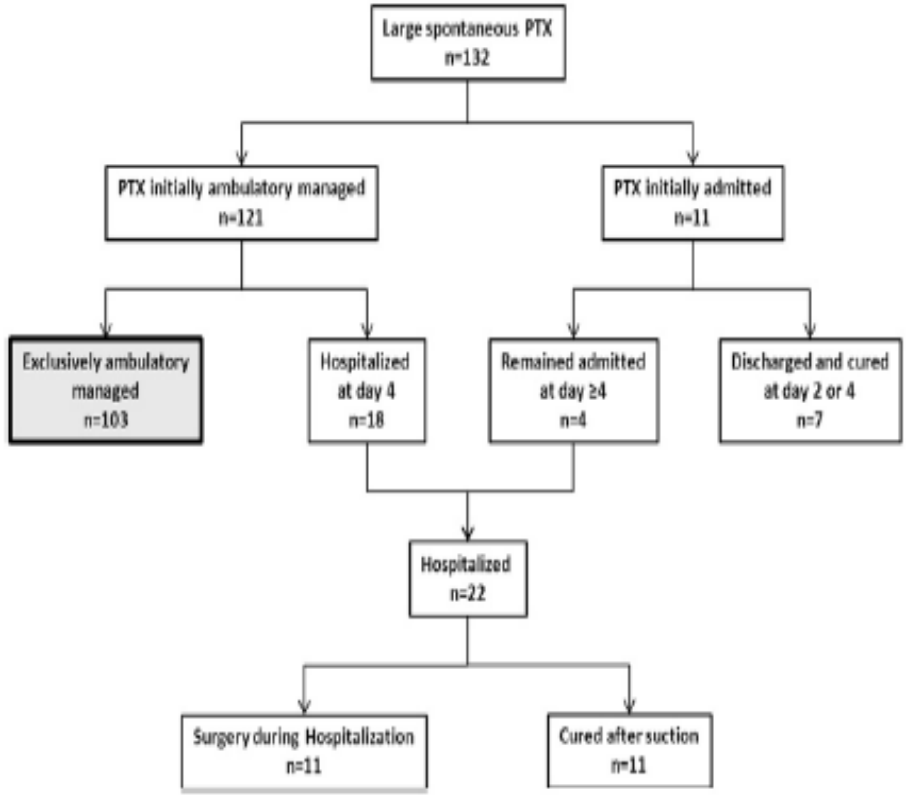


Massongo M et al, *ERJ* 2014

ΥΠΑΡΧΕΙ ΖΩΗ ΠΕΡΑ ΑΠΟ ΤΟ ΘΩΡΑΚΟΣΩΛΗΝΑ;…

- Βαλβίδες Heimlich (Τεχνική Seldinger)





Of the 132 patients managed with a pigtail catheter, 103 were managed exclusively as outpatients, with full resolution of the pneumothorax by day 2 or 4, which represents an ambulatory success rate of 78% (95% CI 71% to 85%) (Figure 3).

Voisin F et al, *Ann Emerg Med* 2014

ΕΧΘΡΟΣ ΤΟΥ ΚΑΛΟΥ ΤΟ ΚΑΛΥΤΕΡΟ…

Massongo M et al, *ERJ* 2014

Masih I et al, *Respiratory Medicine Case Reports* 2017

ΕΧΘΡΟΣ ΤΟΥ ΚΑΛΟΥ ΤΟ ΚΑΛΥΤΕΡΟ…

90% επιτυχής αντιμετώπιση αυτόματου πνευμοθώρακα σε 10 ασθενείς (4 με PSP και 6 με SSP)

Tufail M et al, *ERJ* 2015

77% επιτυχής αντιμετώπιση 18 ασθενών (8 με PSP, 8 με SSP και 2 ιατρογενείς)

Jones L et al, *BMJ Case Rep* 2019

ΤΟ ΜΕΛΛΟΝ…

Pleural disease

BMJ Open Respiratory Research

Randomised Ambulatory Management of Primary Pneumothorax (RAMPP): protocol of an open-label, randomised controlled trial

Rob Hallifax,[1,2] Magda Laskawiec-Szkonter,[2] Melissa Dobson,[2] Stephen Gerry,[3] Robert F Miller,[4] John E Harvey,[5] Najib Rahman[1,6]

the 'Fitness for discharge' criteria, which are all of the following:

- Patient agreement.
- Clinically stable cardiorespiratory observations (oxygen saturation, respiratory and heart rate, blood pressure).
- No increase in size of pneumothorax (since last review).
- Not requiring oxygen or other ventilator assistance.
- Patient is mobile and independent to self-care.
- Written information on point of contact if there are concerns and follow-up plan.
- Patient lives with a responsible person at home and is able to help the patient if required.

Τυχαιοποιημένη μελέτη 226 ασθενών με PSP όπου θα γίνεται σύγκριση της τοποθέτησης Rocket Pleural Vent και του θεραπευτικού αλγορίθμου της BTS

PRIMARY OUTCOME

The primary outcome measure will be total length of stay in hospital to include primary hospital stay and readmissions up to 30 days postrandomisation. Patients remaining in hospital overnight will be classed as 1 day; those discharged on the same day (after either successful NA (needle aspiration) treatment or treatment with pleural vent) will have a zero length of stay. These attend-

ΕΙΝΑΙ ΕΦΙΚΤΗ Η ΑΝΤΙΜΕΤΩΠΙΣΗ ΤΟΥ PSP ΣΕ ΕΞΩΤΕΡΙΚΗ ΒΑΣΗ;;;

- Ναι με προϋποθέσεις

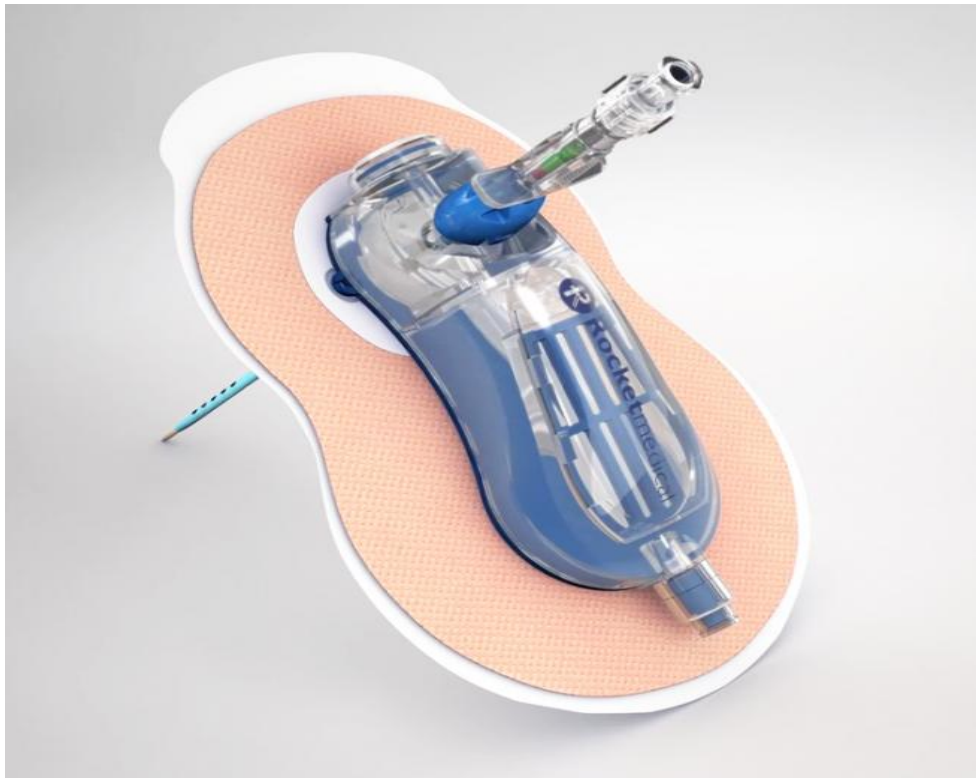
➢ Ενημερωμένο και πρόθυμο περιβάλλον

➢ Δυνατότητα άμεσης πρόσβασης σε νοσοκομείο σε περίπτωση επιδείνωσης

➢ Καλά οργανωμένο εξωτερικό ιατρείο με δυνατότητα συχνής παρακολούθησης

1963

2019



ΕΥΧΑΡΙΣΤΩ ΠΟΛΥ

Henry Heimlich, 1920-2016