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|  <p style="text-align: center;"><b>CREDIT VALLEY</b><br/>THE CREDIT VALLEY HOSPITAL</p> | <b>CLINICAL PRACTICE<br/>GUIDELINE</b>                          | <b>PROFESSIONAL<br/>PRACTICE</b> |
| <b>TITLE: ER Treatment of Primary Spontaneous Pneumothorax</b>                                                                                                           |                                                                 |                                  |
| <b>DATE OF ISSUE:</b> 2002, 12                                                                                                                                           | <b>PAGE</b> 1 <b>OF</b> 6 (Appendix)                            | <b>NUMBER:</b> CPG 5-3           |
| <b>SUPERCEDES:</b> New                                                                                                                                                   | <b>ISSUED BY:</b> _____<br><b>TITLE:</b> Chief of Medical Staff |                                  |
|                                                                                                                                                                          | <b>ISSUED BY:</b> _____<br><b>TITLE:</b> President              |                                  |

**Purpose:**

To provide guidelines for the treatment of Primary Spontaneous Pneumothorax.

**Definitions:**

**Primary Spontaneous Pneumothorax (PSP):**

Pneumothorax occurring without antecedent trauma in a patient without apparent underlying lung disease.

**Secondary Spontaneous Pneumothorax (SSP):**

Pneumothorax occurring in a patient with underlying lung disease. See **Table 1** for causes of Secondary Spontaneous Pneumothorax

**Small Pneumothorax:** Less than 3cm. Apex to visceral pleura distance.

**Large Pneumothorax:** Greater than 3cm. Apex to visceral pleura distance.

**Selection Criteria:**

Inclusion

- Primary Spontaneous Pneumothorax

Exclusion

- Secondary Spontaneous Pneumothorax
- Presence of pleural fluid or blood
- Positive pressure ventilation
- Iatrogenic Pneumothorax
- Traumatic Pneumothorax

**Treatment and Monitoring:**

Patients will be monitored to evaluate vital signs, SaO<sub>2</sub>, respiratory status, skin colour, comfort level and emotional state:

Management of pneumothorax centers on evacuating air from the pleural space and preventing recurrences. The selection and approach depends on the following:

- Size of the pneumothorax
  - Severity of symptoms
  - Persistence of an air leak
  - Type of pneumothorax (PSP or SSP)
1. Treatment of PSP will be according to the Algorithm: **“ER Treatment of Primary Spontaneous Pneumothorax” Appendix 1.**
  2. Pleural catheter insertion technique and use of the Heimlich Valve may be viewed by accessing the video titled “ Re-expansion of Spontaneous Pneumothorax Using a Pleural Catheter and a one-way valve” available in the ER department or through the CTVV channel.

Unstable patients with a large pneumothorax should be considered for admission. Initial response to treatment, degree of clinical instability and patient preference will be assessed to determine eligibility for discharge.

Pleural catheters or small bore chest tubes should be the treatment of choice for symptomatic or large PSP. The most common reasons for failure of a pleural catheter are:

- Large air leak (bronco-pleural fistula)
- Fluid blocking the catheter/tubing
- Kinking of the catheter
- Failure to ensure adequate functioning of the Heimlich valve following closure or application of underwater seal and suction

**Chest Tube removal**

- Chest tubes should be removed in a staged manner so as to ensure that the air leak into the pleural space has resolved.
- Ongoing leak can be detected in 2 ways; by the physician clamping the tube for 3-4 hours, observing the patient and repeating a chest radiograph **or** by attaching the catheter to an underwater seal device and observing for bubbling.
- Chest radiography will show complete resolution of the pneumothorax and that there is no clinical evidence of an ongoing leak.

**Surgical Consultation indicated if**

- The patient requires admission
- High-risk occupation or hobby (scuba diving/frequent flying) that patient will not abstain from participating
- Persistent air leak greater than four to seven days to assess the need for surgical intervention
- Re-occurrence of a previously treated spontaneous pneumothorax

**Clinical Considerations:**

- Kinking of the catheter, can be prevented by ensuring that the catheter is inserted all the way, and anchored appropriately with sutures. Tubes that are able to migrate out by even one centimeter will likely kink.
- Kinking can also be prevented by **NOT** inserting the tube one rib space above the skin incision (as is the common teaching for inserting a standard chest tube)
- When attaching the chest tube to water seal chamber and suction, remove the Heimlich Valve so as not to cause permanent dysfunction of the valve.

**Disposition:****Guidelines for discharge from the Emergency Department:**

- Small pneumothorax with no change in size following 4-6 hours observation
- Patients with a re-expanded pneumothorax, who show no evidence of ongoing air leak (catheter was clamped and re-xrayed) can be discharged with removal of the catheter on the same day.
- Patients with a re-expanded pneumothorax which collapses after catheter clamping (ie three way stopcock closed), will usually be discharged with the catheter in place and a Heimlich valve, provided that re-expansion occurs following reopening of the stopcock.
- Patient will comply with treatment recommendations and can obtain prompt emergency medical care

**Guidelines for admission from the Emergency Department:**

- Patients requiring standard size chest tube and suction
- Patients with catheters who need suction to remain re-expanded
- Patient who are assessed to be unreliable or unwilling to return for follow-up

**Follow up:**

- Instruct the patient to return to the emergency department for reassessment and daily chest radiograph until no recurrence of an air leak
- Provide the patient with written discharge instructions (Available in the Emergency Department)
- Persistent air leak greater than four to seven days requires surgical consultation to assess the need for surgical intervention.
- Patients with complete resolution of their pneumothorax, should see their family doctor within a week for re-assessment and repeat chest radiograph.

**Evaluation:**

- Review current practice prior to implementation of CPG
- Follow up review 6 months following implementation of CPG to assess compliance and outcome

**References:**

Management of Spontaneous Pneumothorax, An American College of Chest Physicians Delphi Consensus Statement, Chest, Volume 119, Number 2, February 2001.

Primary Care: Spontaneous Pneumothorax, The New England Journal of Medicine, Volume 342, Number 12, 23 March 2000.

**Approval:**

Emergency Department: November 2002

Emergency Programme Steering Committee: September 2002

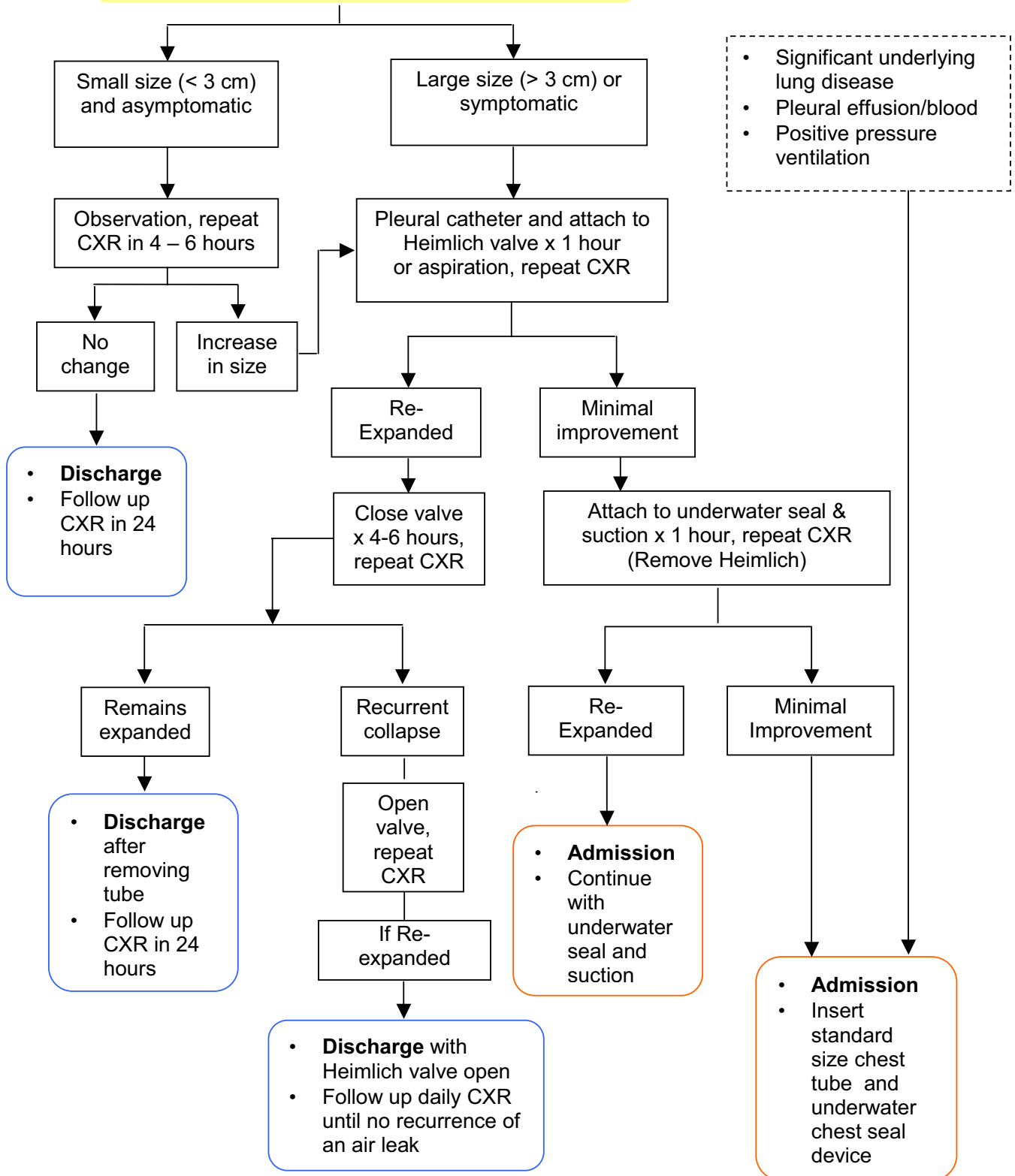
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**Algorithm for ER Treatment of Primary Spontaneous Pneumothorax**

**Primary Spontaneous Pneumothorax**



**Table 1. Causes of Secondary Spontaneous Pneumothorax \***

| <b>Airway disease</b>                                                             |                                               |
|-----------------------------------------------------------------------------------|-----------------------------------------------|
|                                                                                   | Chronic obstructive pulmonary disease         |
|                                                                                   | Cystic fibrosis                               |
|                                                                                   | Status asthmaticus                            |
| <b>Infectious Lung Disease</b>                                                    |                                               |
|                                                                                   | Pneumocystic carinii pneumonia                |
|                                                                                   | Necrotizing pneumonias                        |
| <b>Interstitial Lung Disease</b>                                                  |                                               |
|                                                                                   | Sarcoidosis                                   |
|                                                                                   | Idiopathic pulmonary fibrosis                 |
|                                                                                   | Langerhans' cell granulomatosis               |
|                                                                                   | Lymphangioleiomyomatosis                      |
|                                                                                   | Tuberous sclerosis                            |
| <b>Connective-tissue Disease</b>                                                  |                                               |
|                                                                                   | Rheumatoid arthritis (causes pyopneumothorax) |
|                                                                                   | Ankylosing spondylitis                        |
|                                                                                   | Polymyositis and dermatomyositis              |
|                                                                                   | Scleroderma                                   |
|                                                                                   | Marfan's or Ehler-Danlos Syndrome             |
| <b>Cancer</b>                                                                     |                                               |
|                                                                                   | Sarcoma                                       |
|                                                                                   | Lung Cancer                                   |
| <b>Thoracic endometriosis (related to menses; causes catamenial pneumothorax)</b> |                                               |

\* Categories and disorders are listed according to frequency of occurrence.