

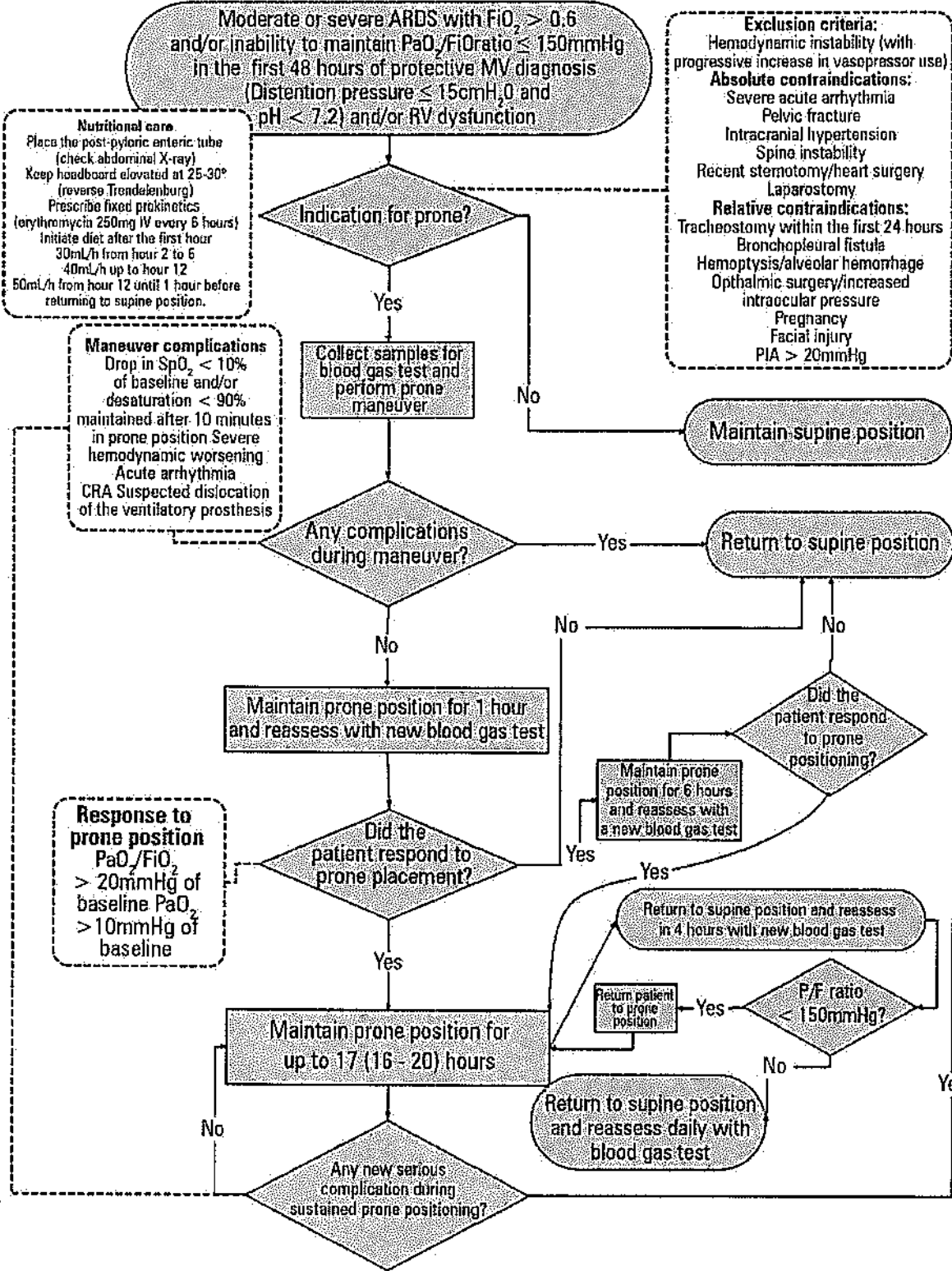
Moderate or severe ARDS with  $FiO_2 > 0.6$  and/or inability to maintain  $PaO_2/FiO_2$  ratio  $\leq 150$  mmHg in the first 48 hours of protective MV diagnosis (Distention pressure  $\leq 15$  cmH<sub>2</sub>O and pH  $< 7.2$ ) and/or RV dysfunction

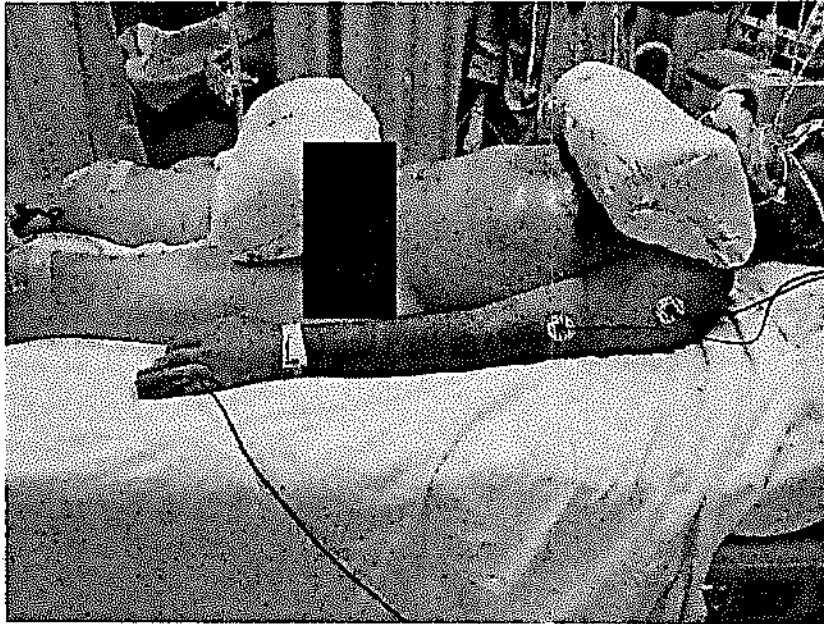
**Exclusion criteria:**  
Hemodynamic instability (with progressive increase in vasopressor use)  
**Absolute contraindications:**  
Severe acute arrhythmia  
Pelvic fracture  
Intracranial hypertension  
Spine instability  
Recent sternotomy/heart surgery  
Laparostomy  
**Relative contraindications:**  
Tracheostomy within the first 24 hours  
Bronchopleural fistula  
Hemoptysis/alveolar hemorrhage  
Ophthalmic surgery/increased intraocular pressure  
Pregnancy  
Facial injury  
PIA  $> 20$  mmHg

**Nutritional care:**  
Place the post-pyloric enteric tube (check abdominal X-ray)  
Keep headboard elevated at 25-30° (reverse Trendelenburg)  
Prescribe fixed prokinetics (erythromycin 250mg IV every 6 hours)  
Initiate diet after the first hour  
30mL/h from hour 2 to 6  
40mL/h up to hour 12  
50mL/h from hour 12 until 1 hour before returning to supine position.

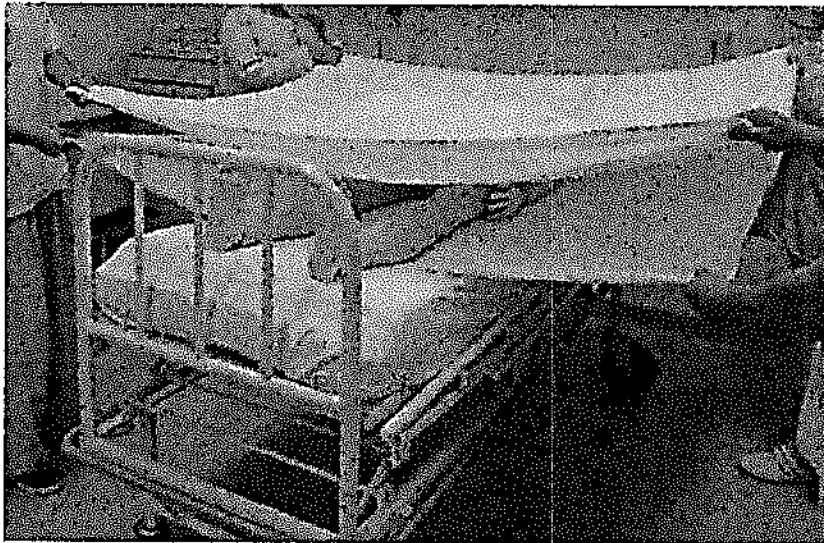
**Maneuver complications:**  
Drop in  $SpO_2 < 10\%$  of baseline and/or desaturation  $< 90\%$  maintained after 10 minutes in prone position  
Severe hemodynamic worsening  
Acute arrhythmia  
CRA Suspected dislocation of the ventilatory prosthesis

**Response to prone position:**  
 $PaO_2/FiO_2 > 20$  mmHg of baseline  
 $PaO_2 > 10$  mmHg of baseline





**Figure 3 - Placement of the cushions on the chest and pelvis before the envelope maneuver is performed.**



**Figure 4 - Envelope Maneuver. Step 1: Position the top sheet over the lower sheet. Place drains, tubes and invasive pressure transducer inside the envelope.**



Figure 5 - Envelope Maneuver, Step 2: Join and wrap the top and bottom sheet as closely as possible to the patient's body.

#### Post-manuever care



Figure 6 - Envelope Maneuver, Step 3: Start turning the patient on the physician's command. Move the patient to the side of the bed opposite the mechanical ventilator.

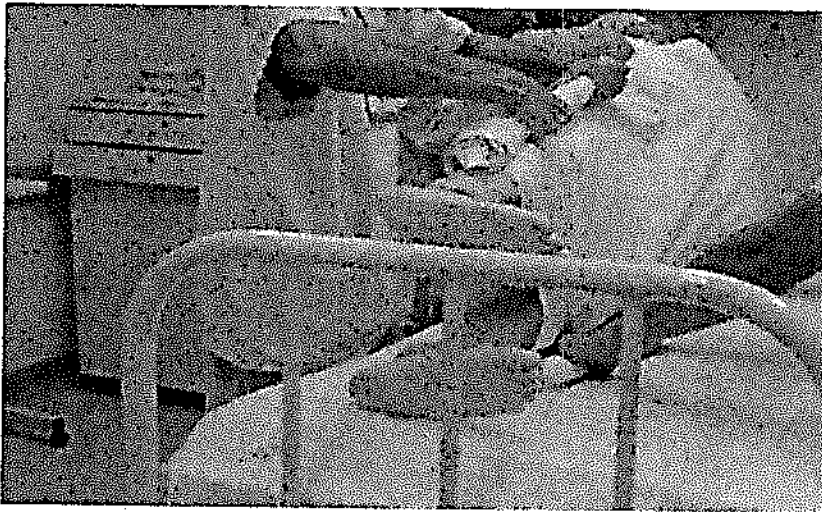


Figure 7 - Envelope Maneuver, Step 4: Turn the patient to lateral position. Perform the hand exchange maneuver among the team by placing one hand on the left side and one on the right side of the patient.



Figure 8 - Envelope Maneuver. Step 5: End of rotation and prone positioning and start of post-manuever care.



Figure 9 - Post-manuever care (check the placement of the cushions, keeping the abdomen free).

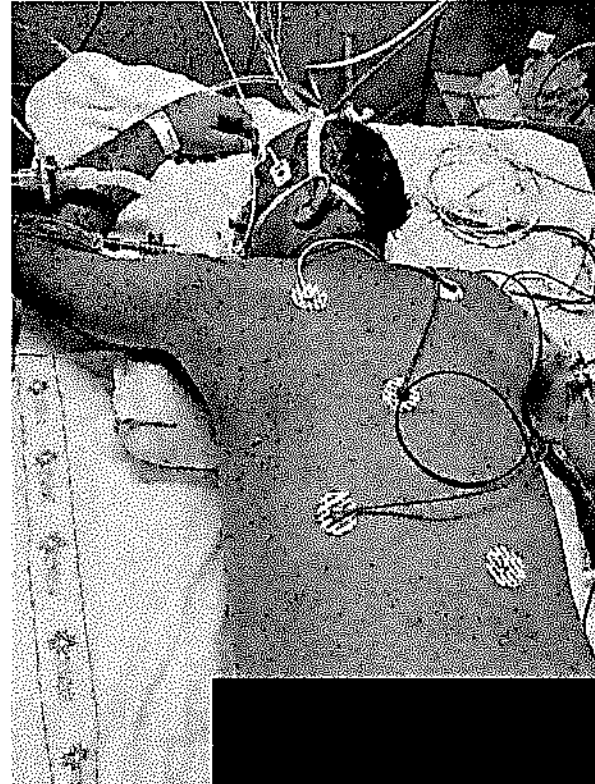


Figure 10 - Swimmer's position (one arm raised and head rotated toward the raised arm; the other arm is positioned alongside the body).

**SAFE PRONE CHECKLIST**

Date: \_\_\_/\_\_\_/\_\_\_ Shift: \_\_\_ Time of pronation: \_\_\_:\_\_\_ Time of return to supine position: \_\_\_:\_\_\_

PATIENT LABEL  
HERE

Perform the activities below, according to the abbreviations: TEC (nursing technician), NUR (nurse), FHY (physical therapist), DOC (physician)

PRE-MANUEVER - TIME IN	PERFORMANCE OF MANUEVER	POST-MANUEVER - TIME OUT
<b>Care</b>	<b>Records</b>	<b>Positioning</b>
<input type="checkbox"/> TEC: Suspend and open NET in bottle 2 hours before time for the diet break.	<input type="checkbox"/> TEC: BIS, vital signs, MV parameters	
<b>Materials</b>	<b>Preparation for manuever:</b>	
<input type="checkbox"/> NUR/PHY: Provide cushions <i>Making: pyramid pillow + 2 sheets + pillow slip hold together with adhesive tape.</i>	<input type="checkbox"/> NUR: Position MAP electrodes and transducer in ULs and align monitoring and axillary cables.	<input type="checkbox"/> DOC: Confirm ETT or TCT position
<input type="checkbox"/> TEC: Place crash cart and intubation nearby	<input type="checkbox"/> TEC: Disconnect BIS, NET bottle, aspirator	<input type="checkbox"/> NUR/PHY: Place face cushion
<input type="checkbox"/> TEC: Test aspiration equipment and ambu	<input type="checkbox"/> TEC: Clamp tubes and drains except the chest drain and place between the patient's legs or arms	<input type="checkbox"/> TEC 1: Rostert infusions
<b>Care</b>	<b>Performance of the manuever</b>	<input type="checkbox"/> NUR: Place MAP transducer (view point ZERO)
<input type="checkbox"/> TEC: Perform eye care (hydration and occlusion). Skin care: hydrocolloid in ( ) face, ( ) chest, ( ) iliac crest, ( ) knees, ( )		<input type="checkbox"/> TEC 1: Place electrodes on the back
<input type="checkbox"/> NUR: Review fixation of invasive and curative devices. <i>Review extensor length</i>		<input type="checkbox"/> TEC 2: Place tubes and drains and open clamps
<input type="checkbox"/> NUR: Suspend continuous hemodialysis, recirculate and heparinize catheter		<input type="checkbox"/> NUR/PHY: Elevate upper limb into swimmer's position.
<b>Airway</b>		<input type="checkbox"/> TEC/PHY: Place the remaining cushions (head, below and above the knee)
<input type="checkbox"/> TEC: Aspirate AS and ETT or TCT	<input type="checkbox"/> TEC: Place headboard in flat position and align limbs	<input type="checkbox"/> TEC: Reverse Trendelenburg (raise headboard as high as the bed allows)
<input type="checkbox"/> NUR: Check cord fixation, record mouth corners, and ETT cuff pressure	<input type="checkbox"/> NUR/PHY: Place the cushions on the pelvis and chest	
<input type="checkbox"/> DOC/PHY: Pre-oxygenate (FiO <sub>2</sub> 100% for 10 minutes)	<input type="checkbox"/> TEC: Suspend infusions and disconnect. <i>maintain only vasopressor and PTN</i>	
	<input type="checkbox"/> TEC/NUR/PHY: Form the ENVELOPE (wrap the edge of the sheets as closely as possible to the patient's body)	<b>Care</b>
	<input type="checkbox"/> Perform the manuever (do not forget the 3 turning points)	<input type="checkbox"/> NUR: Rostert continuous hemodialysis if hemodynamic and ventilatory stability is maintained
<b>Analgesia and sedation</b>	<b>Adverse events</b>	<input type="checkbox"/> NUR/TEC/PHY/DOC: Alternate swimmer's position every 2 hours
<input type="checkbox"/> DOC: Evaluate need for increased sedation and paralyzation (evaluate BIS values)	<b>ATTENTION:</b>	<input type="checkbox"/> TEC: Relieve pressure points
	<b>NO X-RAY IN PRONE POSITION.</b>	<input type="checkbox"/> TEC: BIS, vital signs, MV parameters, mouth corners, cuff pressure and interferences
	<b>In case of a chest tube: DO NOT CLAMP THE CHEST TUBE!</b>	<b>Diet</b>
		<input type="checkbox"/> NUR: Restart diet after 1 hour (30mL/hour or according to medical assessment) if there are no interferences Time of diet restarted: ___h
		<input type="checkbox"/> TEC: Observe tolerance to diet and progress: 40mL/hour after 6 hours and 50mL/hour after 12 hours in prone

**TEAM ORGANIZATION**

**STEP 1 – TIME and TEAM definition**

⇒ The physician decides for the prone position and agrees with nurse and physical therapist the time for implementing the maneuver. The nurse decides the participating team (6 members: 1 physician, 1 physical therapist, 1 nurse and 2 technicians; the sixth participant will be only responsible for checklist).

Duties during the maneuver:

Nurse: Invasive MAP/withholding drugs/revising diet

Physician: care of the OTT during the maneuver and post-maneuver checking

Physical therapist: tube suction

Technician 1: removing and replacing electrodes

Technician 2: clamping and releasing tubes

**ATTENTION:** In case of a chest tube, the team should have one additional member responsible for the care of the chest tube and respective bottle.

**DO NOT CLAMP THE CHEST TUBE!**

**STEP 2 – Provide pillows (responsible: physical therapist)**

**STEP 3 – Pre-maneuver care (responsible: nurse)**

**STEP 4 – Team reunion for executing the maneuver**

⇒ At the time scheduled, the team should gather: the physician takes position at the head of the bed, the nurse and the physical therapist by both sides of the patient's torso, and two technicians. A team member not involved in the maneuver should check/assist the entire procedure.

⇒ The time-in (pre-maneuver care) should be checked with all team members reunited, although the execution should had been previously performed.

⇒ In case of cardiorespiratory arrest, resuscitate the patient in prone position!

**RECORDS**

**ARTERIAL GAS COLLECTED**

	Supine position (before prone)	1 hour in prone position	6 hours in prone position	End of prone position	4 hours in supine position	12 hours in supine position
PaO <sub>2</sub>						
PaCO <sub>2</sub>						
pH						
SaO <sub>2</sub>						
FiO <sub>2</sub>						

**VENTILATORY MECHANICS**

	Supine position	1 hour in prone position	End of prone position	4 hours in supine position
peakp				
platp				

**CHECKLIST FOR RETURN TO SUPINE POSITION**

Date: \_\_\_/\_\_\_/\_\_\_ Shift: \_\_\_ Time of pronation: \_\_\_:\_\_\_ Time of return to supine position: \_\_\_:\_\_\_

PATIENT LABEL  
HERE

Perform the activities below according to the abbreviations: TEC (nursing technician), NUR (nurse), FHY (physical therapist), DOC (physician).

PRE-MANEUVER - TIME IN	PERFORMANCE OF MANEUVER	POST-MANEUVER - TIME OUT
<b>Diet</b>	<b>Records</b>	<b>Positioning</b>
<input type="checkbox"/> TEC: Suspend and open NET in bottle 2 hours before time of the diet break; _____ h	<input type="checkbox"/> TEC: BIS, vital signs, MV parameters	<input type="checkbox"/> DOC: Confirm ETT or TCT position
<b>Materials</b>	<b>Preparation for maneuver</b>	<input type="checkbox"/> TEC: Restart infusions.
<input type="checkbox"/> TEC: Place crash cart and intubation unit nearby	<input type="checkbox"/> NUR: Place MAP electrodes and transducer in ULs and align monitoring end oximetry cables	<input type="checkbox"/> NUR: Position MAP transducer (review point ZERO)
<input type="checkbox"/> TEC: Test aspiration equipment and ambu	<input type="checkbox"/> TEC: Disconnect BIS, NET bottle, aspirator	<input type="checkbox"/> NUR: Place electrodes of the anterior chest
<b>Care</b>	<input type="checkbox"/> TEC: Clamp tubes and drains, except chest drain, and place on the bed sheet	<input type="checkbox"/> TEC: Position tubes and drains and open clamps
<input type="checkbox"/> NUR: Review fixation of invasive and curative devices	<b>Performance of the maneuver</b>	<input type="checkbox"/> TEC: Trendelenburg ( <i>elevar a la horizontal</i> )
<input type="checkbox"/> NUR: Suspend continuous hemodialysis, recirculate and heparinize catheter	<input type="checkbox"/> TEC: Place bed in flat position and align limbs	<b>Care</b>
<b>Airway</b>	<input type="checkbox"/> TEC: Suspend infusions and disconnect (maintain only vasopressor and PTN).	<input type="checkbox"/> NUR: Restart continuous hemodialysis if hemodynamic and ventilatory stability is maintained
<input type="checkbox"/> TEC: Aspirate AS and ETT or TCT	<input type="checkbox"/> Perform the maneuver (3 turning points)	<input type="checkbox"/> TEC: Record BIS, vital signs, MV parameters; mouth corners, cuff pressures and interferences
<input type="checkbox"/> NUR: Check cord fixation, record mouth corners and ETT cuff pressure	<b>Adverse events</b>	<input type="checkbox"/> TEC: Dismantle the pillow, hygienize with glucoprotein and store in the materials room
<input type="checkbox"/> DOC/PHY: Pre-oxygenate (FiO <sub>2</sub> 100% for 10 minutes)	<b>ATTENTION: NO X-RAY IN PRONE POSITION.</b>	<b>Diet</b>
<b>Analgesia and sedation</b>	<b>In case of a cardiorespiratory arrest, resuscitate the patient in prone position!</b>	<input type="checkbox"/> TEC: Restart diet after 1 hour Time of diet restarted: _____ h
<input type="checkbox"/> DOC: Evaluate the need of additional sedation and curarization. (Assess the value of BIS if available)		<b>Consulting</b>
		<input type="checkbox"/> NUR: Request consulting with a psychologist to inform family members of prone position patients.