



アテレクリア宮殿 (Mobilization 編)

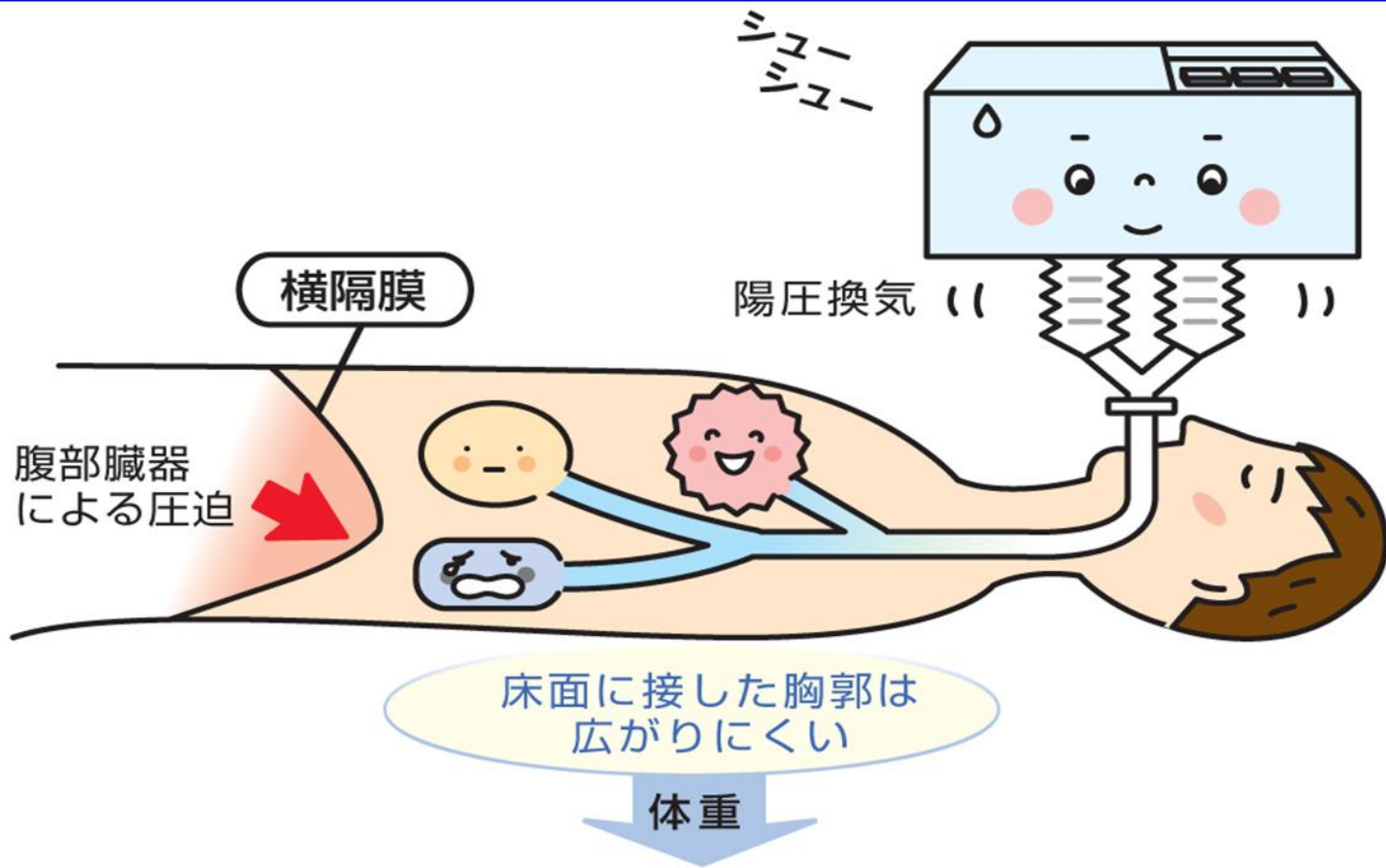
**1) 無気肺の予防・改善のエビデンス
(Mobilization編)**

**2) Mobilization時に
併せて考えるべきアプローチ**

①排痰

②せん妄予防

術後における無気肺

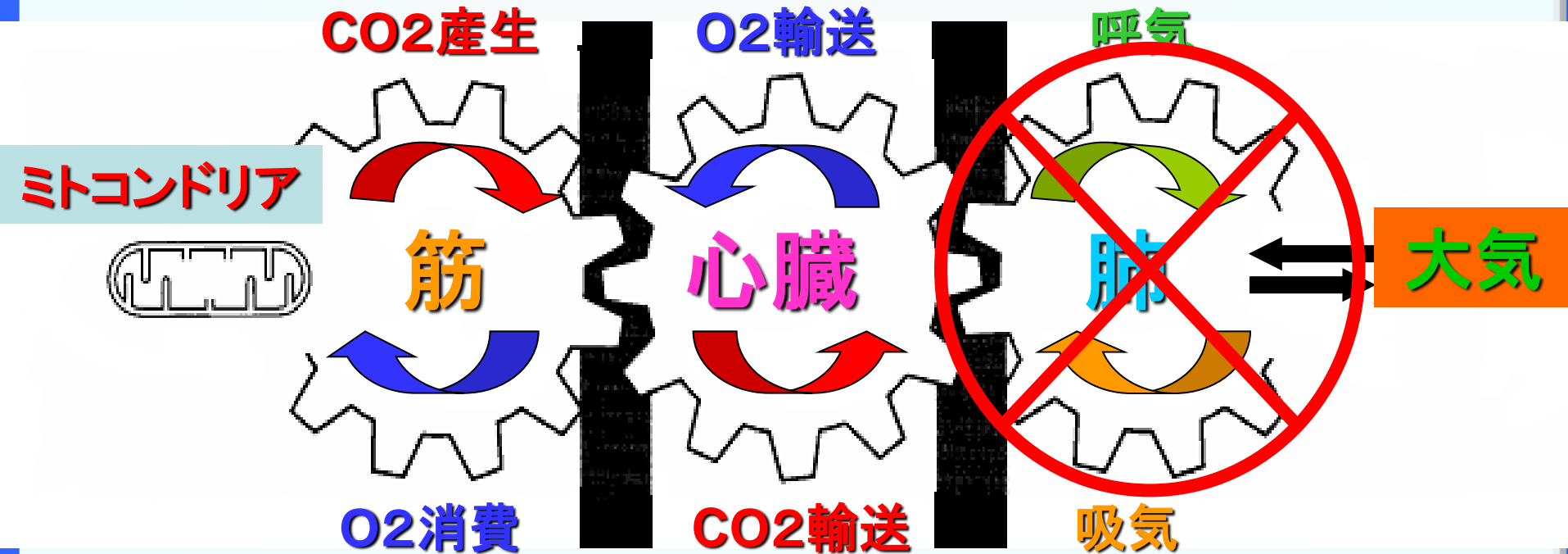




術後呼吸機能低下のリスク

末梢循環

肺循環



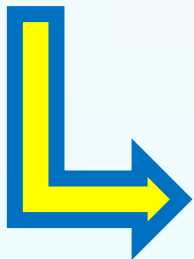
ワッサーマンの歯車



無気肺への対策

1 体位変換

2 早期離床



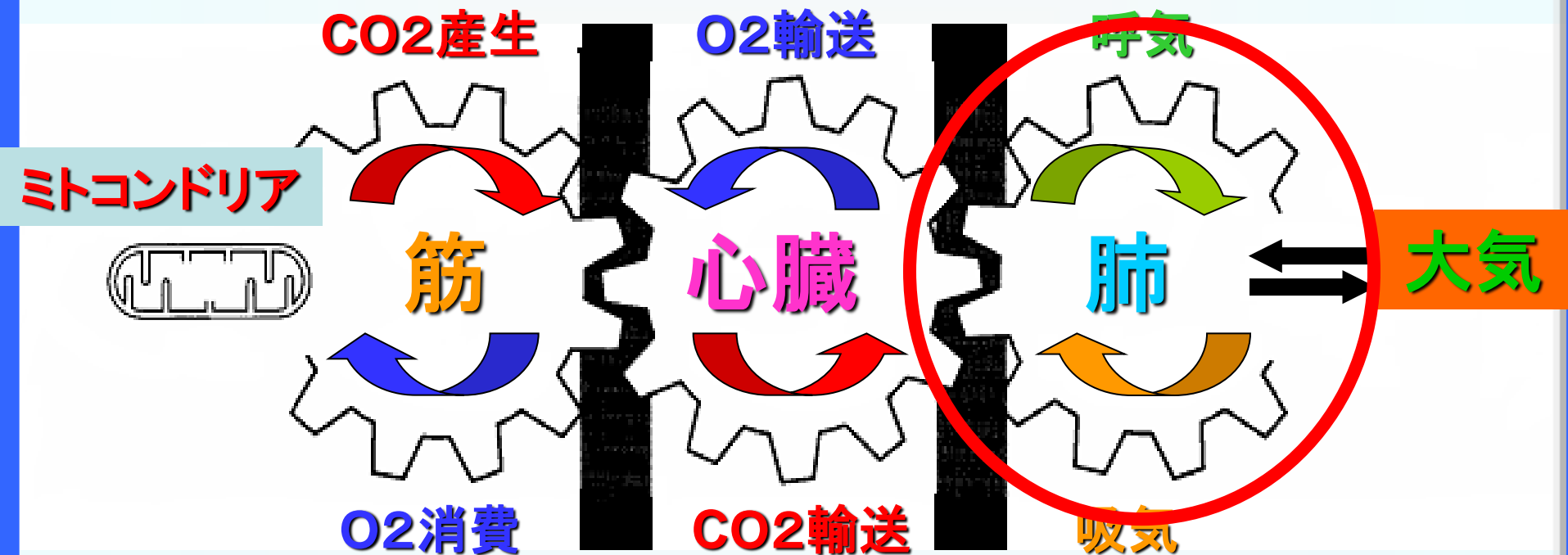
Mobilization



ワッサーマンの歯車

末梢循環

肺循環





こんな症例には要注意！

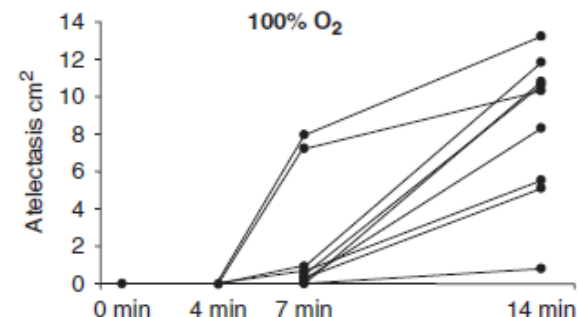
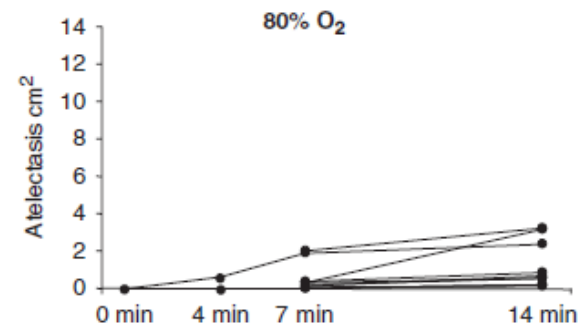
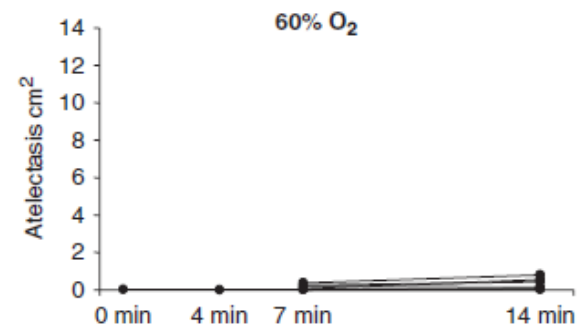
Atelectasis in patients given 100%, 80% or 60% oxygen at 4, 7 and 14 min after start of pre-oxygenation and anaesthesia induction in early group.

	Percent inspired oxygen during induction		
Time ↓	100	80	60
Awake	0	0	0
<i>n</i>	9	10	8
4 min	0	0.03	0
Range	0-0	0-0.5	0-0
<i>N</i>	3	4	2
7 min	0.5*	0.2*	0.1*
Range	0-7.9	0-2.0	0-0.3
<i>N</i>	9	10	7
14 min	10.3*	0.6*	0.3*
Range	0.8-13.2	0.1-3.2	0-0.8
<i>N</i>	9	10	8

L. Edmark et al.

Oxygen and dynamics of atelectasis formation during anaesthesia

Acta Anaesthesiol Scand 2011; 55: 75-81





早期離床は腹部術後の呼吸器合併症 を減少させる

24h以内離床 VS 25~48h離床 (n=1363)

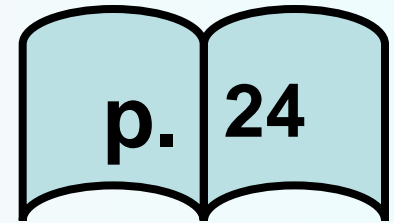


TABLE 2.—*Pulmonary Complications*

	T	V	E.A.	L.A.	T.E.A.	V.E.A.	T.L.A.	V.L.A.
Pulmonary complications.....	29 4%	57 10%	27 4%	59 9%	13 3%	14 7%	16 7%	43 11%
Total cases.....	760	603	714	649	523	191	237	412



排痰に必要な3要素

- ① 重力 • Mobilization
- ② 痰の粘性 • 加湿
 • 粘液繊毛エスカレーター
- ③ 空気の量と速さ • 十分な吸気量
 • 呼気流速



Lung ultrasound in the reexpansion of pulmonary atelectasis

Fabrizio Elia • Andrea Verhovez • Paola Molino •
Giovanni Ferrari • Franco Aprà

狙った無気肺は
改善できている？

Received: 22 December 2010 / Accepted: 16 March 2011 / Published online: 30 March 2011
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Case report

A 60-year-old man was admitted to our hospital complaining of dyspnea and productive cough that had been present for 24 h. One year prior, the patient had been diagnosed with amyotrophic lateral sclerosis. On admission, he was bedridden, had a tracheotomy, was ventilator-dependent and fed by enteral nutrition by means of a gastrostomy tube.

The vital signs were: blood pressure 120/80 mmHg, heart rate 110 beats/min, temperature 37°C. Percutaneous oxygen saturation was 85% on 80% ventilator-delivered oxygen. Physical examination revealed decreased breath sounds over the right lung and rales compatible with the presence of bronchial secretions over the left lung.

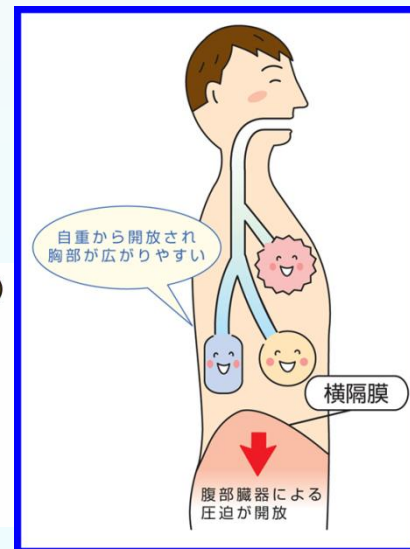
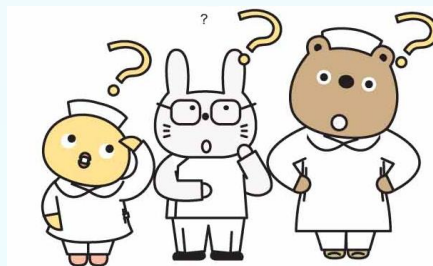
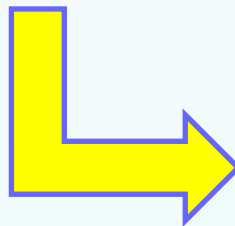
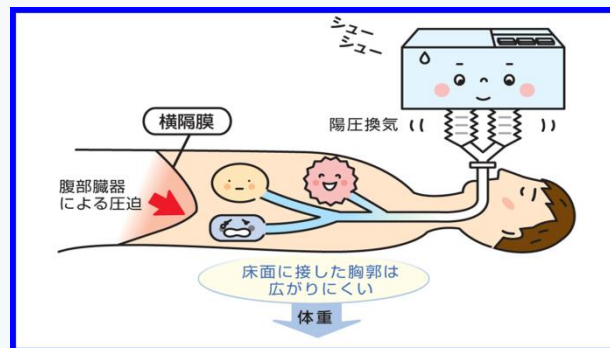
A Chest x-ray study showed an opacification of the lower half of the right lung fields with mild homolateral mediastinal displacement suggesting pulmonary atelectasis (Fig. 1). Electrocardiography was unremarkable. Blood gas

analysis revealed hypocapnic respiratory failure. Other laboratory tests were normal except for a mild leucocytosis. The emergency physician performed a lung ultrasound (US), which confirmed the presence of a right pulmonary atelectasis appearing as an area of pulmonary parenchyma with a tissue-like pattern and abolished lung sliding in the presence of lung pulse (Fig. 2, Online Resource 1).

In order to remove secretions, a bronchoscopy was performed while simultaneously checking for adequate pulmonary reexpansion with US imaging. As airway clearing progressed, the US study showed the appearance of an air bronchogram near the hilar pulmonary structures (Fig. 3, Online Resource 2), gradually advancing toward the peripheral parenchyma (Fig. 4, Online Resource 3) till pulmonary reexpansion was completed, as evidenced by the appearance of lung sliding and the disappearance of the tissue-like pattern (Fig. 5, Online Resource 4).

After the procedure, the oxygen saturation was 95% on 40% ventilator-delivered oxygen. The physical examination revealed bilateral breath sounds.

せん妄の患者さん・・・ 離床してしまえば大丈夫??



せん妄の患者さんって・・・

表4 譫妄の分類

1) 活動過剰型譫妄

精神運動興奮、錯乱、声高、易刺激性、衝動行動、夜間譫妄、不眠、了解不能

2) 活動低下型譫妄

無表情、無言、昼間の傾眠、的外れ応答、記憶力低下、痴呆、失禁

3) 混合型譫妄

1) と 2) の間で反復。昼間に傾眠、夜間興奮状態になることが多い

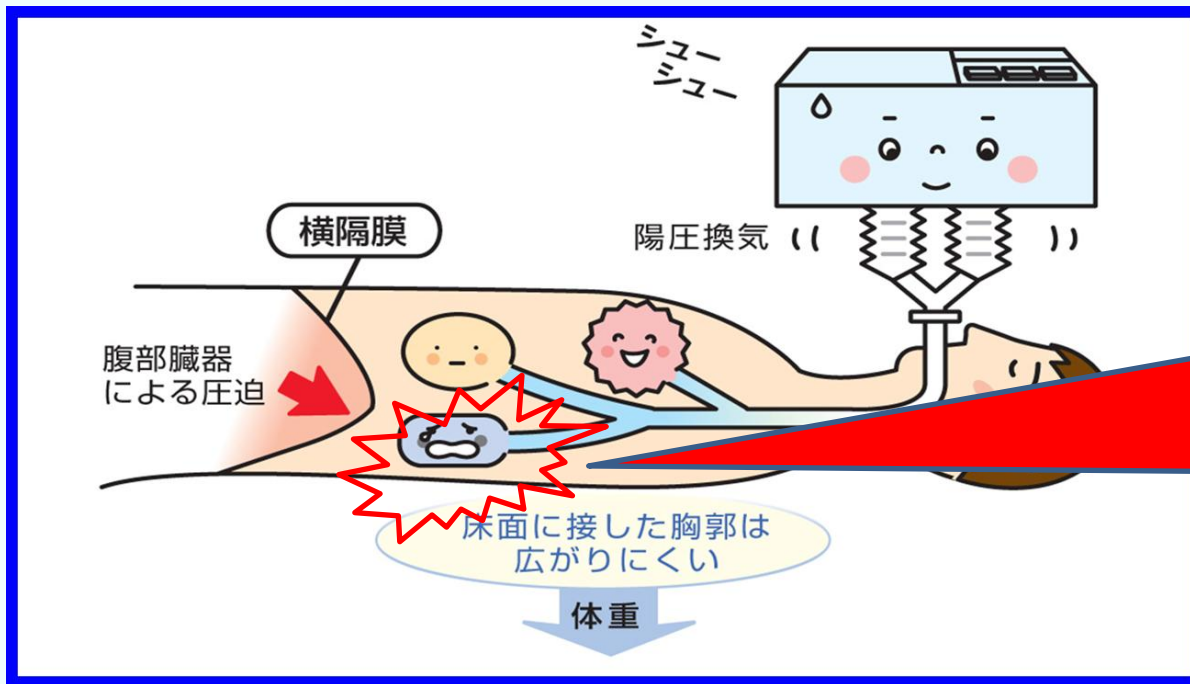
興奮状態！呼吸は？？



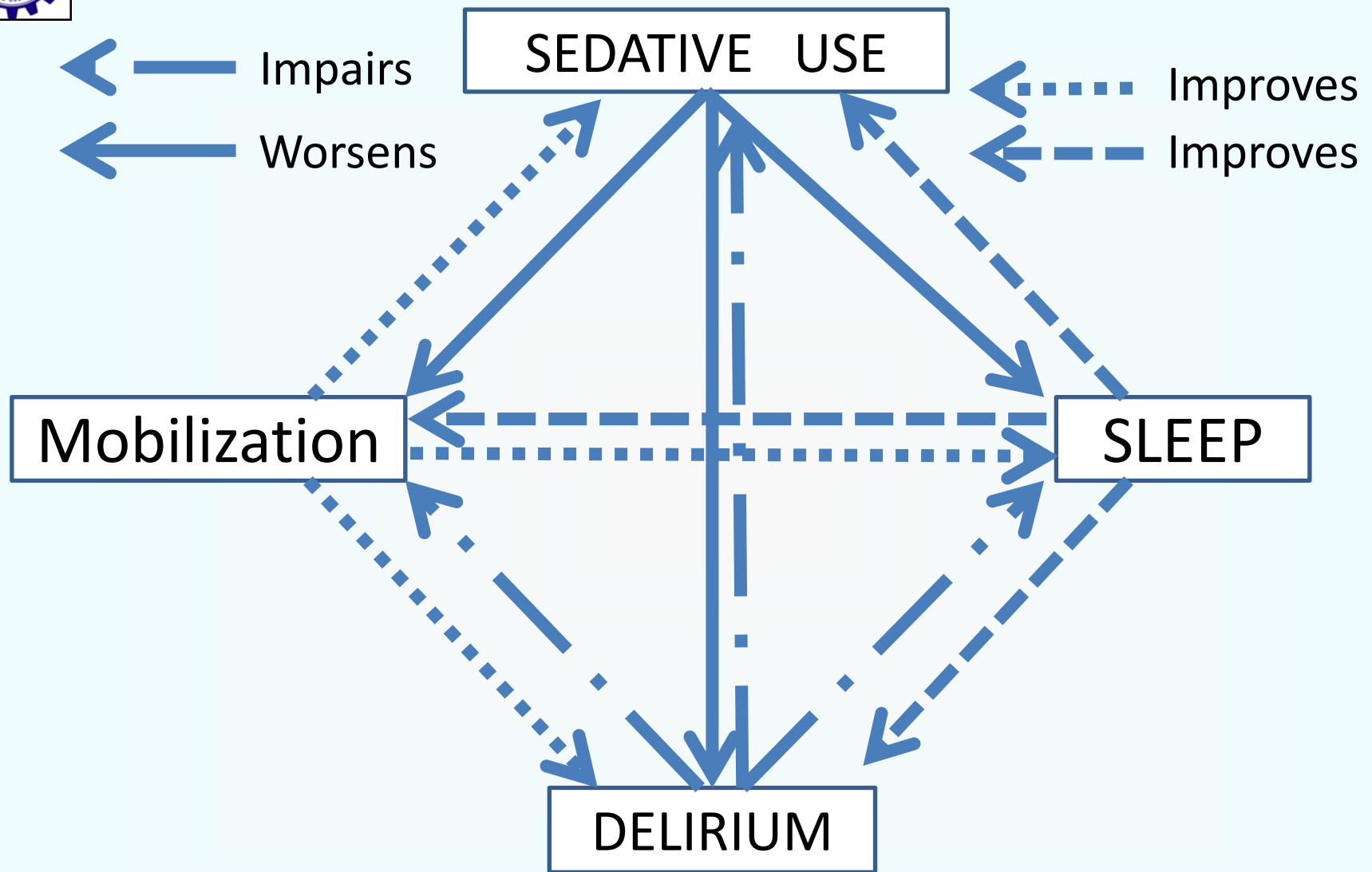
逆に鎮静してしまうと・・・

術後鎮静により無気肺の発生

谷山ら 2002 松本歯大歯科麻酔学



まさに
この状態
(; ;)





では、対処方法は??

早期離床と鎮痛がせん妄予防に効果あり！

Table 3 Delirium-related outcomes of the two groups

	Intervention (n = 202)	Control (n = 136)	P value
Delirium present	16(7.9%)	35(25.7%)	< 0.001
Onset of delirium from surgery (days)	1.5 ± 1.1	2.5 ± 1.7	0.019
Duration of delirium (days)	1.1 ± 0.4	2.1 ± 1.5	< 0.001

Data represent the mean ± standard deviation or the number of patients.

山内康太ら: 上部開腹術における術後譫妄防止に対する硬膜外鎮痛下理学療法の有効性.
日集中医誌2011;599-605.



72時間以上 人工呼吸器管理となった104例

n=49

早期離床群

RoM ex

自動運動

Head up

椅子座位

立位・足ぶみ

n=55

普通のケア群

PT・OTによる

介入なし




通常の離床



	Intervention (n=49)	Control (n=55)	p value
<u>Return to independent functional status at hospital discharge</u>	29 (59%)	19 (35%)	0.02
ICU delirium (days)	2.0 (0.0-6.0)	4.0 (2.0-7.0)	0.03
Time in ICU with delirium (%)	33% (0-58)	57% (33-69)	0.02
<u>Hospital delirium (days)</u>	2.0 (0.0-6.0)	4.0 (2.0-8.0)	0.02
Hospital days with delirium (%)	28% (26)	41% (27)	0.01
Barthel Index score at hospital discharge	75 (7.5-95)	55 (0-85)	0.05
ICU-acquired paresis at hospital discharge	15 (31%)	27 (49%)	0.09
<u>Ventilator-free days*</u>	23.5 (7.4-25.6)	21.1 (0.0-23.8)	0.05
Duration of mechanical ventilation (days)	3.4 (2.3-7.3)	6.1 (4.0-9.6)	0.02
Duration of mechanical ventilation, survivors (days)	3.7 (2.3-7.7)	5.6 (3.4-8.4)	0.19
Duration of mechanical ventilation, non-survivors (days)	2.5 (2.4-5.5)	9.5 (5.9-14.1)	0.04
Length of stay in ICU (days)	5.9 (4.5-13.2)	7.9 (6.1-12.9)	0.08
Length of stay in hospital (days)	13.5 (8.0-23.1)	12.9 (8.9-19.8)	0.93
Hospital mortality	9 (18%)	14 (25%)	0.53

Data are n (%), median (IQR), or mean (SD). ICU=intensive care unit. *Ventilator-free days from study day 1 to day 28. Barthel Index scale 0-100, APACHE II scale 0-71.

早期離床群は・・・

- ADLの自立がはやい 
- せん妄発生率が有意に低い 
- 人工呼吸器離脱期間が長い 

Schweickert et al : Lancet 373 : 1874-1882,2009



まとめ(私が考えるこの一手！)

- 1) 無気肺の予防・改善には積極的Mobilization
(起こすこと)は有用である。**
- 2) 積極的Mobilization時には多角的ケア
(排痰・鎮痛・鎮静等)により無気肺の予防と
せん妄の予防も効果が期待できる。**