Analysis of perioperative major non-neurologic complications in 105 posterior vertebral column resection (PVCR) procedures for severe rigid deformities during 10 years

--Introspection on the balance between patients’ risk and benefit

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Disclosures

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Background

• **Posterior Vertebral Column Resection**
  – Severe/Rigid/Angular curves
  – Powerful technique: *gain remarkable correction*
  – Potentially higher risk

• **PVCR Vs Osteotomy:**
  Fundamental differ to traditional 3-column osteotomies
However

- Lifethreatening complications
  - Worrisome and memorable adverse events

- Life Safety
  - Major non-neurological complications (MNMC)
  - Death, cardiac arrest, MI, stroke, DIC, PE, respiratory failure, pneumonia, deep infection, sepsis, irreformable hypotension, optic deficit, and major vessel injure
Methods

• 10 years 105 cases

• 58 female and 47 male

• Age 18.9 (10-45) years

• Evaluate
  – **MNMC**
  – Demographic data
  – Radiological features
  – Neurological status
  – Cardiac abnormalities
  – Pulmonary function…
PVCR

Posterior vertebral column resection for correction of rigid spinal deformity curves greater than 100°

Clinical article

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- Scoliosis
  108.9°±25.5° to 37.2°±16.8°
- Segmental kyphosis
  89.8°±31.1° to 30.4°±15.3°
- A total of 31 peri-operative MNNC in 24 patients
Results

- Overall peri-operative MNNC prevalence: 22.9%

- **Death:** 1 case
- **Respiratory events:** 16 in 13 cases
  - pulmonary embolism (2), respiratory failure (8), and pneumonia (6)
- **Cardiovascular adverse events:** 9 in 7 cases
  - cardiac arrest (1), acute left heart failure (3), malignant arrhythmia (2), and irreformable hypotension (3)
- **Malignant hyperthermia:** 1 case
- **Optic deficit:** 1 case
- **Deep wound infection:** 3 cases
Results

- Tendency of high incidence rate noted in
  - Non-idiopathic deformity (29.4%)
  - T6 and upper apex (40.0%)
  - Kyphoscoliosis A curve (27.1%)

- MNNC patients exhibited significantly greater than patients without MNNC

- Length of operative time (660 vs 582 min, P=0.046)

- Greater EBL (5492 vs 4461 ml, P=0.007)

- Lesser FVC% (44.5 vs 51.4%, P=0.017) and FEV 1.0% (42.7 vs 50.2%, P=0.012)
• Risk factors for MNNC occurrence:
  - Non-idiopathic deformity ($P=0.024$)
  - Large scoliotic curve $>150^\circ$ ($P=0.009$)
  - Predicated FVC% ($P=0.015$) and FEV1.0% $<40\%$ ($P=0.009$)
  - EBL $>5000\text{ml}$ ($P=0.001$)
Discussion

The outstanding radiographic outcomes of PVCR for severe and rigid deformity accompanied notable high risk of non-neurological complications

- Complex procedures
- Time consumed
- Decreased physical status
- Dysfunction involved multiple systems and organs
Respiratory System

- The most common MNNC

- Preoperative PFTs abnormal associated with postoperative pul. complications

- Ventilation training

- PFTs in PVCR patients
  - 2-week: significant decreased
  - 1-year: increased up to pre- baseline
  - 2-years: improved
Conclusion

- **Risk vs. Benefit**

**Neurological safety:**

*balance between dynamic and static*

**Life safety:**

*PVCR may not be the first choice in caring of majority deformities, especially inadequate experienced teams*

**Indication and contraindication of PVCR:**

*must be gradually integrated and standardized*
References