

Comparison of the pulmonary function between open anterior release and thoracoscopic anterior release

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– Abstract –

Study Design: Retrospective study

Objectives: To evaluate the results of a serial pulmonary function test in severe scoliosis that required an anterior release and posterior fusion

Summary of Literature Review: There are a few reports on the pulmonary function after an anterior release and posterior fusion in severe scoliosis.

Materials and Methods: Twenty two cases of severe scoliosis requiring an anterior release and posterior fusion were followed up more than 2 years. The patients were divided into two groups (group 1: 10 cases of open thoracotomy and posterior fusion, group 2: 12 cases of thoracoscopic release and posterior fusion). The forced vital capacity (FVC), forced expiratory volume 1 (FEV1), total lung capacity (TLC), the predicted FVC, predicted FEV1 and predicted TLC in the preoperative, 3 month, 6 month, 1 year, 2 year postoperative period in the two groups were compared. Statistical analysis was performed using a paired T- test.

Results: The average preoperative FVC in groups 1 and 2 were checked as 2.20 L and 2.30 L, respectively. The postoperative 3 month FVC were checked as 1.60 L and 1.81 L, respectively, which were the lowest levels throughout the serial follow-up. The postoperative 6 month FVC were 1.70 L and 2.15 L, respectively. The postoperative 2 year FVC were 2.17 L and 2.18 L, respectively, which were 98.6% and 94.8% of the preoperative FVC. The average preoperative FEV1 of group 1 was 1.95 L. The postoperative 3 month FEV1 were at the lowest level and the postoperative 2 year FEV1 was 1.80 L (92.3% of preoperative value). The average preoperative FEV1 of group 2 was 2.05 L. The postoperative 6 month FEV1 was 1.90 L (92.7% of preoperative value). The TLC of group 2 showed a faster recovery than that of group 1. The predicted FVC, FEV1 and TLC of both groups at 2 years after surgery were 2~4% lower than the baseline. The recovery pattern in group 1 was steady for 2 years. The postoperative 6-month value was similar to the postoperative 2-year value in group 2.

Conclusions: In severe scoliosis with a decreased pulmonary function, those undergoing thoracoscopic anterior release had a faster pulmonary function recovery than those undergoing an open thoracotomy.

Key Words: Severe scoliosis, Open thoracotomy, Thoracoscopy, Pulmonary function test

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Table 1. Absolute values of pulmonary function test in Group 1

Pulmonary fuction	Preoperative	3 Months	6 Months	1 Year	2 Years
FVC	2.20 ± 0.45	1.60 ± 0.40 (p=0.005)	1.70 ± 0.36 (p=0.005)	1.90 ± 0.36 (p=0.019)	2.17 ± 0.41 (p=0.706)
FEV ₁	1.95 ± 0.38	1.30 ± 0.36 (p=0.005)	1.50 ± 0.32 (p=0.005)	1.70 ± 0.31 (p=0.012)	1.80 ± 0.35 (p=0.132)
TLC	2.70 ± 0.52	2.15 ± 0.41 (p=0.005)	2.21 ± 0.41 (p=0.005)	2.47 ± 0.40 (p=0.009)	2.63 ± 0.41 (p=0.314)

Table 2. Absolute values of pulmonary function test in Group 2

Pulmonary fuction	Preoperative	3 Months	6 Months	1 Year	2 Years
FVC	2.30 ± 0.74	1.81 ± 0.65 (p=0.002)	2.15 ± 0.69 (p=0.059)	2.14 ± 0.68 (p=0.054)	2.18 ± 0.68 (p=0.081)
FEV ₁	2.05 ± 0.70	1.52 ± 0.53 (p=0.002)	1.90 ± 0.59 (p=0.111)	1.91 ± 0.60 (p=0.131)	1.89 ± 0.59 (p=0.134)
TLC	2.90 ± 0.78	2.38 ± 0.68 (p=0.002)	2.64 ± 0.74 (p=0.037)	2.65 ± 0.74 (p=0.037)	2.65 ± 0.72 (p=0.046)

1 5.1 (4 6) , 2 , 3 1 , 4 1 , 5 1 . 1

4.9 (4 6) . 3 41.9% 2 40.5% 22

7. 41.1% . Cobb , 78.2 °

(70 ~ 86) 1 Cobb 36.3 (26 44)

53.8%(48.8 62.9) ,

Cobb 39.2 °(29 47)

50.1%(44.6 58.6) . 7 12

15.0 (-10 43)

19.4 (9 47) ,

21.7 (10 49) . 2 Cobb 76.8 °

(70 90) 36.6 (28 50)

52.7%(44.4 60.0) ,

38.8 (28 54) 49.9%(40.0 60.0) .

16.3 (-12 47)

21.2 (7 51) ,

22.8 (9 51) .

1 2.20 L, 3

1.60 L (p=0.005), 6 1.70 L (p=0.005),

1 1.90 L (p=0.019), 2 2.17 L 2

98.6% . 2

2.30 L, 3 1.81 L

(p=0.002), 6 2.15 L, 1 2.14 L,

2 2.18 L 6 93.5%

7 7 2 4 2 94.8%

Table 3. Percent predicted values of pulmonary function test in Group 1

Pulmonary fuction	Preoperative	3 Months	6 Months	1 Year	2 Years
FVC	66.3 ± 6.6	53.5 ± 6.0 (p=0.005)	57.8 ± 6.3 (p=0.005)	60.2 ± 6.1 (p=0.005)	63.3 ± 6.6 (p=0.189)
FEV ₁	62.9 ± 6.8	45.6 ± 6.1 (p=0.005)	50.6 ± 5.8 (p=0.005)	56.0 ± 5.9 (p=0.007)	59.4 ± 7.1 (p=0.089)
TLC	71.9 ± 6.5	59.7 ± 5.5 (p=0.005)	61.2 ± 5.7 (p=0.005)	66.1 ± 6.1 (p=0.005)	68.5 ± 6.8 (p=0.067)

Table 4. Percent predicted values of pulmonary function test in Group 2

Pulmonary fuction	Preoperative	3 Months	6 Months	1 Year	2 Years
FVC	66.5 ± 6.5	57.5 ± 6.3 (p=0.002)	62.7 ± 6.3 (p=0.060)	63.3 ± 6.1 (p=0.084)	63.7 ± 6.5 (p=0.117)
FEV ₁	63.1 ± 6.4	49.6 ± 5.9 (p=0.002)	58.5 ± 6.2 (p=0.048)	61.2 ± 6.2 (p=0.289)	61.0 ± 5.9 (p=0.347)
TLC	72.2 ± 6.7	63.2 ± 7.0 (p=0.002)	69.6 ± 7.1 (p=0.136)	69.6 ± 6.9 (p=0.117)	69.8 ± 6.7 (p=0.117)

. 1 1 1.95 L 1 3 가 (p=0.005) 가 , 1 10 3 2 1.80 L 92.3% . . 2 1 2.05 L 6 , - 1.90 L 92.7% . . 1 3 가 (p=0.005) 2 가 , 2 6 (Table 1, 2). 1 66.3% 3 53.5% (p=0.005), 6 57.8% (p=0.005), 1 60.2% (p=0.005), 2 63.3% 2 3% . 2 , , 가 (p=0.002) 6 62.7%, 2 6 1 가 1 62.9% crankshaft phenomenon 2 가 2 59.4% 3.5% . 2 63.1% 6 58.5% (p=0.048). (Table 3, 4).

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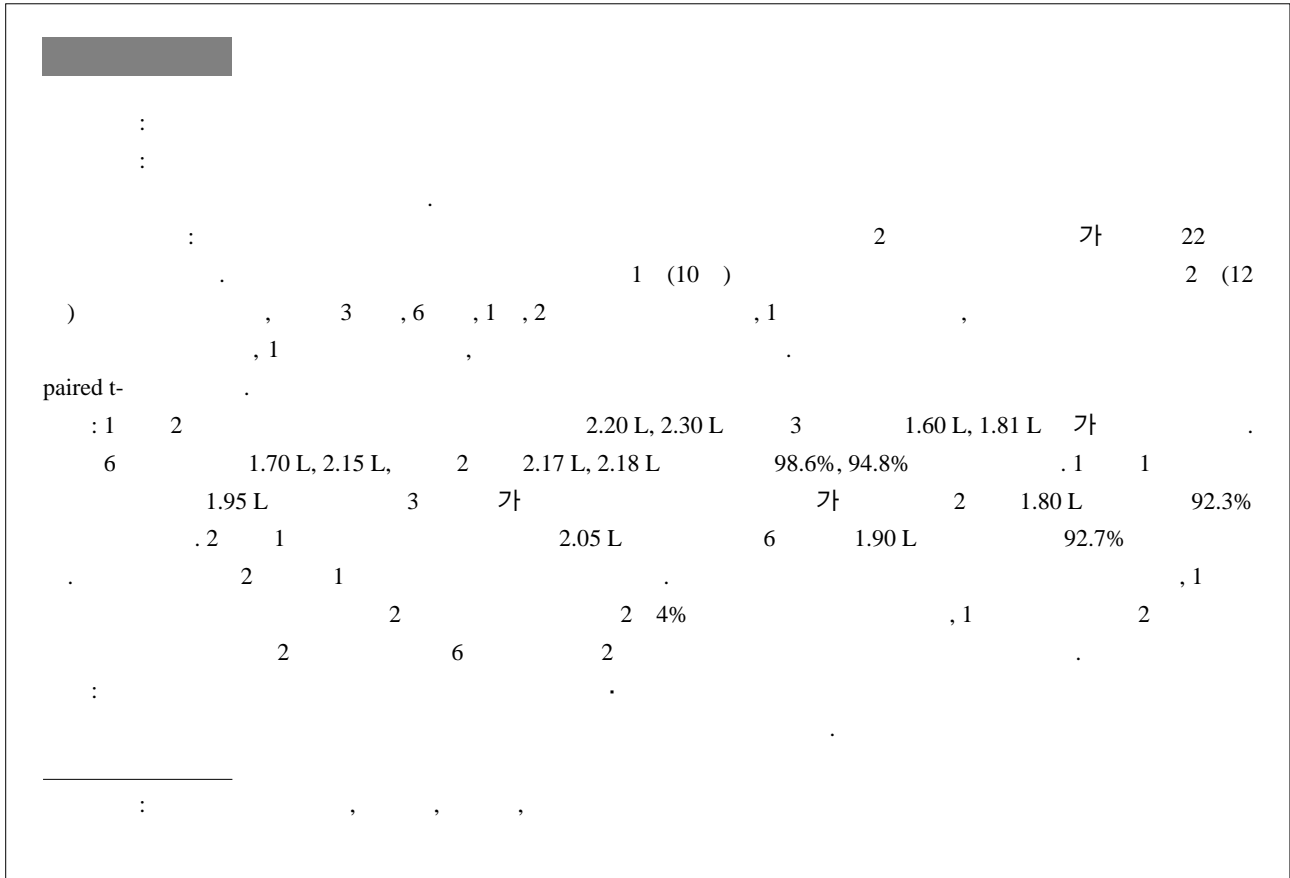
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