Spinal Fusion in Patients With Duchenne's Muscular Dystrophy and a Low Predicted Forced Vital Capacity

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Introduction

- Forced vital capacity (FVC) often used as a marker or indicator for spinal fusion in DMD scoliosis
- Most authors suggest an FVC > 30-40% of predicted values as being the minimum acceptable for surgery
- We plan to show that spinal fusion surgery can be performed safely in patients with an FVC <30%

Patients and Methods

- Patients with scoliosis secondary to DMD who had undergone spinal fusions between January 1990 and December 1999

- Retrospective data collection

A comparison of key mean data from the two sub-groups and the whole group

GROUP	NUMBER OF PATIENTS	AGE AT SURGERY (years.months)	AGE OF NONAMBULANCE	PFVC	CURVE CORRECTION (degrees)	OP TIME (minutes)	BLOOD LOSS (litres)	TUBE TIME (hours)	TIME ON RESPIRATORY SUPPORT (hours)	TIME ON RESPIRATORY SUPPORT EXCLUDING PATIENT WITH TRACHEOTOMY (hours)	IN-PATIENT STAY ALL PATIENTS (days)	IN-PATIENT STAY EXCLUDING PATIENT WITH TRACHEOTOMY (days)
<30%	13	14,3	10,2	24%	38,5	209	3,8	19	81	45	20	17
>30%	17	15,1	12,2	40%	34,8	215	5,8	28	74	44	24	22
WHOLE	30	14,8	11,3	33%	36,4	212	4,9	24	77	45	22	20

Results

- 30 patients, mean age 14 yr 8/12 at surgery
  (11 years 2/12-19 years)
- Mean age non ambulance 11 years 4/12
  (7-17 years)
- Posterior only fusion, all fused to pelvis
- Mean levels 15 (T3 to sacrum)
- Mean FVC 33% of predicted values (18%-60%)
- 13 patients with FVC<30%, 17>30%

Results

- Mean time intubated 24 hours

  (5 hours – 3 days 16 hours)

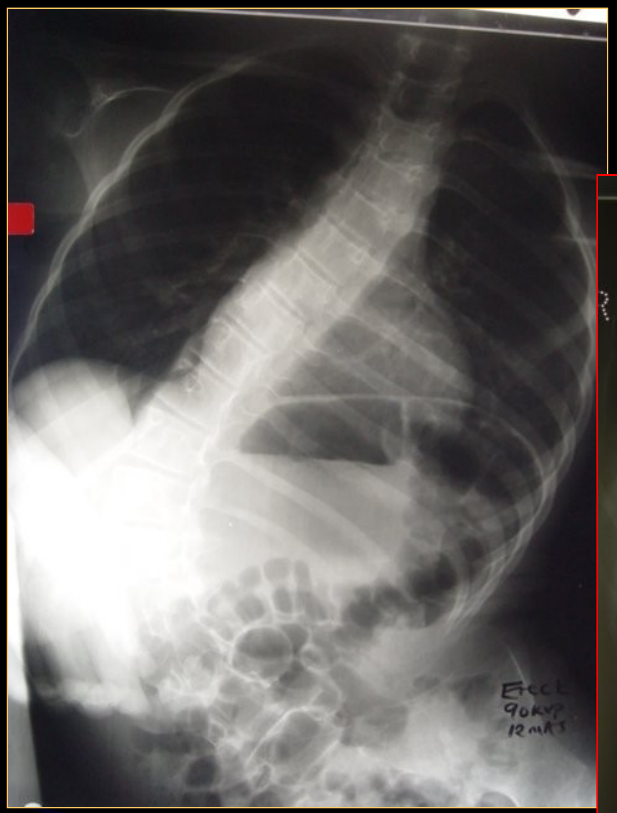
  - 4 patients required reintubation
  - 2 required temporary tracheotomies
- Mean ventilatory support time (all patients)

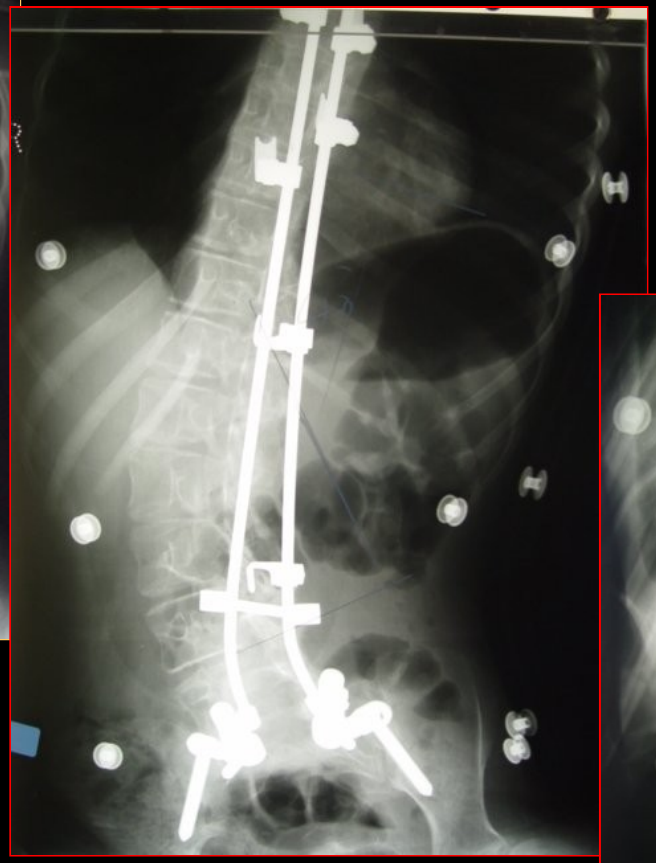
  77 hours (5 hours – 23 days)
- Mean ventilatory support time (non trachy patients)

  42 hours (5 hours – 6 days 3 hours)

Results

- Mean pre operative curve 61 (30^0-90^0)
- Mean correction 36 (16^0-61^0)
- Mean operation time 212 minutes (120-345 minutes)
- Mean blood loss 4.9 litres (1.4-10 litres)


90KVP
12mAs

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Complications

- 2 wound infections, 1 requiring surgical debridement and re-suture
- 8 other major complications
  - Poor respiratory effort (25% FVC) 128 hours ventilatory support
  - Pleural effusion (40% FVC) drained under USS
  - 1 chest infection settled on BIPAP/antibiotics (30%)
  - 2 reintubated for exhaustion due to infection (21%/55%)
  - 1 cardiac arrest (55%) secondary to hyperkalaemia

2 Temporary Tracheotomies

- FVC 34%, fusion T2 to pelvis
- 552 hours (23 days) ventilatory support time due to pneumonia
  - Tracheotomy removed after 39 days
  - Discharged home 62 days post operatively

- 20% FVC, fusion T3 to pelvis
- Respiratory arrest due to tension pneumothorax day 3 postop
  - Developed pneumonia and required 510 hours (21 days) of respiratory support
  - Tracheotomy removed after 27 days
  - Discharged home 50 days post operatively

Discussion

- Fusion to the pelvis removes the risk of curve progression if the fusion is stopped at L5
- Operation time in this series similar to other published studies
- Blood loss in this series is higher than in other series
  - Blood loss was higher in the >30% FVC group

Discussion

- Complications following surgery were seen in both the >30% and <30% groups
- Overall rate of major complications was 30% (9/30) and is similar to reported series
- Mean ventilatory support times and post operative stays were similar in the two groups

Discussion

- Largest reported series of patients with a FVC of <30%

- 1 patient with cardiomyopathy
  - Twice mean intubation time
  - Twice mean ventilatory support time
  - Twice mean post operative stay
  - Represents more advanced stage of disease, even though FVC >30%

Conclusions

This series shows that patients with an FVC <30% can be offered spinal fusion surgery provided that the surgery is performed in a facility with appropriately experienced surgeons, anaesthetists, nurses and ancillary staff

Thank You