LETTER

One-year survival in congenital diaphragmatic hernia, 1995–2006

A retrospective study of neonates with congenital diaphragmatic hernia (CDH) was conducted at Great Ormond Street Hospital, a tertiary paediatric centre, between January 1995 and December 2006 with comparison of two treatment periods of 6 years each. Management and 1-year survival rates of 147 consecutive patients using the oxygenation index to assess the severity of acute respiratory failure were analysed. In the first 6 years (January 1995 to December 2000, period 1) 64 neonates were admitted and in the second 6 years (January 2001 to December 2006, period 2) 83 neonates were treated.

Early management strategy (period 1) included early surgical repair and aggressive hyperventilation in an attempt to control persistent pulmonary hypertension. High peak pressures, ventilator rates and oxygen concentrations were needed resulting in pulmonary barotrauma. In the second period a new protocol was introduced delivering a protective lung strategy including gentle ventilation, permissive hypercarbia and delayed surgical repair. The change in management focused on minimising iatrogenic injury to the lungs prior to surgery and gradual reversal of pulmonary hypertension.

The overall survival rate for the 12 years was 77%. There was an increase in survival rates from 70% in the first time period to 82% in the second. An overall increase from 29% to 45% was also observed in the use of inhaled nitric oxide (iNO) and from 20% to 62% in the use of high frequency oscillatory ventilation (HFOV).

A quarter (25%) of our patients were referred to extra corporeal membrane oscillation (ECMO) and this percentage remained unchanged between the two periods. Our overall survival rate for those referred to ECMO was 51%, however there was a significant overall increase in survival for those referred to ECMO from 38% to 62% when comparing the two periods. When analysing the patients according to their worst oxygenation index, there was no survival benefit in patients with an oxygenation index of 40–60 when comparing conventional treatment and ECMO. Patients with an oxygenation index >60 showed a clear survival benefit from ECMO (table 1).

In conclusion, our current management of CDH, which emphasises pre-operative stabilisation of cardio-pulmonary physiology and a gentle ventilation strategy prior to surgical correction, is associated with increased survival rates.

Although there are no randomised clinical trials showing the efficacy of the newer treatment modalities including HFOV, iNO and ECMO, multiple retrospective analyses, including ours, show improved survival rates.^{1 2}

Table 1 Outcome for patients with an oxygenation index >40

	ECMO	ECMO survival	% Survival	Conventional treatment	Conventional survival	% Survival
OI 41–50						
Total	5	5	100%	4	4	100%
Period 1	3	3	100%	1	1	100%
Period 2	2	2	100%	3	3	100%
OI 51–60						
Total	4	0	0%	2	0	0%
Period 1	2	0	0%	2	0	0%
Period 2	2	0	0%	0	0	
OI >61						
Total	20	11	55%	6	0	0%
Period 1	9	3	33%	3	0	0%
Period 2	11	8	73%	3	0	0%

ECMO, extra corporeal membrane oscillation; OI, oxygenation index.

ECMO should be reserved as rescue therapy for patients who are refractory to maximal medical therapy and needs to be very carefully considered as mortality and morbidity remain high.^{3 4} It may be possible to raise the threshold for referral to ECMO as conventional treatment is producing increasingly better outcomes. Careful patient selection and advances in our management of patients with CDH prior to commencing ECMO can improve mortality rates as shown in this series.

N L Mettauer,¹ C M Pierce,¹ J V Cassidy,² E M Kiely,³ A J Petros¹

¹ Paediatric Intensive Care Unit, Great Ormond Street Hospital, London, UK; ² Paediatric Intensive Care Unit, Freeman Hospital, Newcastle upon Tyne, UK; ³ Paediatric Surgical Unit, Great Ormond Street Hospital, London, UK

Correspondence to: Dr Nicole Mettauer, Paediatric Intensive Care Unit, Great Ormond Street Hospital for Children, London WC1N 3JH, UK; nmettauer@bluewin.ch

Competing interests: None.

Accepted 26 November 2008

Arch Dis Child 2009;**94**:407. doi:10.1136/adc.2008.144550corr1

REFERENCES

1. **Bagolan P**, Casaccia G, Crescenzi F, *et al*. Impact of a current treatment protocol on outcome of high-risk congenital hernia. *J Pediatr Surg* 2004;**39**:313–18.
2. **Boloker J**, Bateman DA, Wung JT, *et al*. Congenital diaphragmatic hernia in 120 infants treated consecutively with permissive hypercapnea/spontaneous respiration/elective repair. *J Pediatr Surg* 2002;**37**:357–66.
3. **Khan AM**, Lally KP. The role of extracorporeal membrane oxygenation in the management of infants with congenital diaphragmatic hernia. *Semin Perinatol* 2005;**29**:118–22.
4. **Davis PJ**, Firmin RK, Manktelow B, *et al*. Long-term outcome following extracorporeal membrane oxygenation for congenital diaphragmatic hernia: the UK experience. *J Pediatr* 2004;**144**:309–15.

CORRECTION

doi:10.1136/adc.2008.144550corr1

Newborns at risk of sensorineural hearing loss in low-income countries by B O Olusanya. (*Arch Dis Child* 2008;**94**:227–230). In table 1 on page 229 the Total heading should be n = 3927 and not n = 3800.