PRINCIPLES OF NEONATAL SURGERY INVOLVEMENT IN THE MANAGEMENT CONGENITAL DIAPHRAGMATIC HERNIA (CDH)

1. **Counselling**. Following an antenatal diagnosis CDH, parents should have the opportunity to be counselled by a consultant paediatric surgeon from a centre with regular experience of managing CDH. This counselling should be in addition to other specialties including neonatalolgy and fetal medicine, but not necessarily on the same day.

2. **Antenatal MDT Discussion/Planning.** Neonatal surgeons should be involved in multidisciplinary meetings to discuss antenatal and perinatal management of individual cases. Any management decisions made should be recorded and available for clinicians involved in the management of mother and neonate.

3. **Delivery**. The regional neonatal surgical team should be informed of the delivery of a newborn with CDH to facilitate optimal resource planning

    - This includes alerting the surgical team of planned deliveries of antenatal cases.
    - Information should include relevant antenatal factors including prognostic features.
    - Neonatal surgical teams should have a clear designated point of contact.

4. **Transport**. The need for postnatal transfer should be minimised. This requires, where possible, delivery to take place in a centre with facilities to carry out surgical care, and capable of providing all aspects of neonatal intensive care in the pre- and post-operative period.

5. **Early Neonatal Management.** Neonatal surgeons should be involved in the multidisciplinary team providing early neonatal intensive care, particularly in decisions regarding appropriateness and timing of surgery, and consideration of reorientation of care or potential ECMO referral.

6. **Timing of Surgery**. Repair of the CDH should be undertaken when there is clinical and echocardiographic evidence of resolving pulmonary hypertension and at a time of haemodynamic stability.

7. **Theatre Team.** Teams should include a consultant anaesthetist and consultant neonatal surgeon who have experience of managing newborns with CDH. Where transfer to an operating theatre may compromise haemodynamic stability, the team should have the ability to relocate to the NICU to carry out the repair in that setting.

8. **Surgical technique/principles:**

    - The rationale for surgical approach (i.e. open vs minimally invasive technique) should be clearly documented
    - Routine use of intercostal drains in the immediate post-operative period is not recommended
    - Surgical documentation should include
        - Herniated contents
        - Type of defect as proposed by the CDHSG (see figure 1)
        - Type of repair, including sutures and prosthetic material (if used)
        - Other structural anomalies

9. **Post-operative management**. The neonatal surgical team should be included in decision-making in the post-operative period. Surgeons should provide clear post-operative instructions, including points of contact. Post-operative management decisions should be clearly documented.

10. **Follow up**. Surgeons should be involved in a structured, patient-orientated multidisciplinary follow-up.

11. **Research, Development & Audit.** Centres providing surgical care for children affected by CDH should have a designated lead neonatal surgical consultant. This role should support the reporting of cases and data collection to a national register.

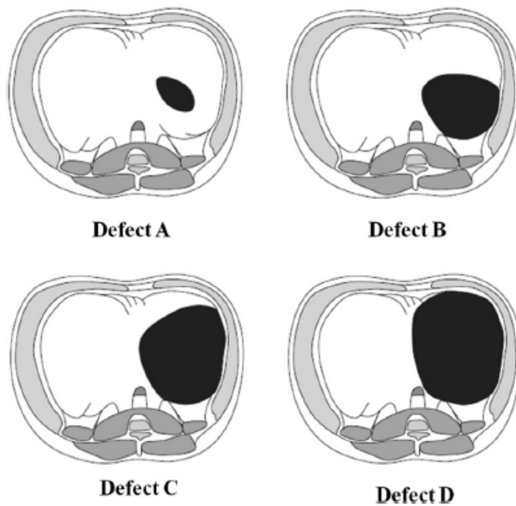

Figure 1 Grading of defect size as recommended by the Congenital Diaphragmatic Hernia Study Group (from Pediatrics;120(3):e651-7, 2007)