1.14 High-dependency care in pregnancy and childhood

High-dependency care is a service provided for patients with potentially recoverable pathological processes who can benefit from more detailed observation and treatment than is generally available on the standard hospital ward.

High-dependency care is usually provided for patients with threatened or established organ failure, which may have arisen as a result of:

- an acute illness
- a complication of pregnancy or delivery
- trauma
- a predictable phase in a planned treatment programme (e.g. after major surgery).

Introduction

Health needs are best met through an integrated approach involving several agencies, including primary and secondary healthcare, education and social services. Together such services may help to prevent some of the conditions that lead to patients requiring intensive care. For example, vaccination programmes will decrease the number of children who develop respiratory failure due to preventable diseases such as pertussis and measles. Education and legislation are important for reducing the number of individuals who are seriously injured in road traffic accidents and in accidents in the home.

High-dependency care is a low-volume, high-demand specialty: Women and girls with complications of pregnancy and children under 2 years of age account for most of those who require high-dependency care. There also may be seasonal variation, with a peak in the winter months associated with respiratory-related illness, or a peak in the rainy season associated with malaria.

Dedicated intensive care units in large tertiary care centres have been shown to have the best outcomes. Ideally, every country in the world should have units that provide this service. However, the majority of patients who require high-dependency or intensive care will present to smaller peripheral hospitals rather than to large tertiary centres. Therefore it is absolutely essential that staff in smaller district hospitals are able to recognise and appropriately treat sick children and pregnant women in the early stages of their illness (see EESS-EMNCH programme – Essential and Emergency Surgical Skills – Emergency Maternal, Neonatal and Child Healthcare Manual and Pocket Book, which can be found on the MCAI website: www.mcai.org.uk).

All medical and nursing staff who undertake high-dependency care should be well trained in emergency care so as to be able to stabilise critically ill or injured patients, and initiate appropriate medical therapy, which may involve intubation and ventilation. A proportion of such patients may then be safely transferred to an intensive care unit if this is still appropriate and a bed is available. Often, with good initial resuscitation and early diagnosis and treatment, the need for intensive care can be avoided. In a patient who requires intensive care, there should be early consultation with the regional/national intensive-care unit, usually by telephone or radio, so that further management can be jointly decided until a retrieval team, if available, arrives to collect the patient.

Transportation of critically ill patients (see Section 1.19), particularly those receiving assisted ventilation, requires appropriately trained staff and equipment. Transportation is best thought of as ‘a high-dependency care bed on wheels’, and the aim should be that the patient does not deteriorate during transport. Before the patient is moved, proper resuscitation and stabilisation are essential.

Children and pregnant mothers exhibit fundamental differences that influence the training of staff and the type and size of equipment available. These differences extend across anatomy, physiology, pharmacology and behaviour. However, both of these patient groups have less reserve and tend to decompensate early and quickly. They also have a greater capacity to make a full recovery.

Provision of high-dependency care is not just about equipment and facilities. The surrounding environment and contact with their family is crucial to the promotion of a patient’s recovery.

Levels of high-dependency/intensive care

There are three levels of care that are designed to make the most appropriate use of staff and equipment resources (see Table 1.14.1). In most resource-limited countries, only Level 1 care is likely to be available, and then only in the most well-funded hospitals, such as those in the capital cities or where medical students are trained.

The majority of patients can be managed at Level 1 with close monitoring, good nursing care and appropriate medical therapy. By providing optimal therapy it is often possible to prevent the deterioration of the patient (e.g. through good fluid management, early but appropriate treatment with antibiotics, and the use of oxygen).

Many hospitals will have poor outcomes if patients have to be ventilated in sites where there is a lack of maintained ventilators, and no reliable oxygen source or blood gas analyser. As far as possible in countries with limited resources, intubation and ventilation should be avoided until they are absolutely necessary. Many patients can tolerate high pCO₂ levels with a compensated pH – it is hypoxia that is potentially fatal. It may be appropriate to develop and have available non-invasive modes of ventilatory support, such as nasal mask or cannula continuous positive airways pressure (CPAP), nasal or face mask intermittent positive pressure ventilation (IPPV), bilevel positive airways pressure (BiPAP), or negative pressure ventilation (CNCP or INPV). Similarly, the more invasive a procedure or monitoring process is, the greater the risk of complications.

Finally, it is essential that hospitals which provide high-dependency care have an on-site biomedical engineer to keep all of the equipment serviced and safe.
TABLE 1.14.1 Levels of high dependency and intensive care

<table>
<thead>
<tr>
<th>Level 3 (intensive care)</th>
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<tbody>
<tr>
<td>Multi-organ failure</td>
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<td>Ideally one or more nurses per patient</td>
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<tr>
<td>Invasive monitoring</td>
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<td>Examples: ventilation, haemofiltration</td>
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<tr>
<td>Optimise medical therapy</td>
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<tr>
<th>Level 2 (intensive care)</th>
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<tr>
<td>Single-organ failure</td>
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<tr>
<td>Ideally one nurse per patient</td>
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<tr>
<td>Non-invasive or invasive monitoring</td>
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<tr>
<td>Example: ventilation</td>
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<tr>
<td>Intubate ↑</td>
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<td>Extubate ↓</td>
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<tr>
<td>Optimise medical therapy</td>
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<table>
<thead>
<tr>
<th>Level 1 (high-dependency care)</th>
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<tr>
<td>Requirement for closer observation and monitoring than is available on the standard ward</td>
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<tr>
<td>Ideally one nurse for every two patients</td>
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<tr>
<td>Non-invasive monitoring</td>
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<tr>
<td>Examples: after major surgery, non-intubated child with severe croup, pregnant woman with severe pre-eclampsia or eclampsia</td>
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Minimum standards for a lead centre providing intensive care

Medical staff
- Senior doctors or physician assistants with appropriate training in high-dependency care medicine.
- Training programme for junior medical staff specialising in high-dependency care.
- Provision of 24-hour cover at both senior and junior level.
- Resident junior cover for 24 hours by staff with skills in emergency care and resuscitation, whose only clinical responsibility is to the high-dependency care unit.
- Access on site to other specialist consultants (e.g. obstetrician, paediatrician, ENT surgeon, anaesthetist).

Nursing staff
- Nursing staff with training in high-dependency care and resuscitation.
- Ongoing training and support for nursing staff.
- Continuous 24-hour observation of each patient at all times by a nurse qualified in high-dependency care, with observations documented.

Support staff
- Availability of a physiotherapist.
- Availability of a pharmacist 24 hours a day.
- Availability of a dietitian.
- Availability of a biomedical engineer 24 hours a day.

Equipment and drugs
- Medical staff and nursing staff with training in how to use all equipment.
- Equipment maintained on a regular basis and according to manufacturer’s guidelines by a biomedical engineer.
- Controlled drugs, especially morphine, available immediately and for 24 hours a day.

Retrieval service
- Available 24 hours a day from the community or other health facilities without high-dependency care (e.g. via an emergency ambulance service; see www.reproductive-health-journal.com/content/pdf/1742-4755-7-21.pdf).
- Does not take staff from the high-dependency unit, leaving it uncovered.
- Usually an experienced doctor, midwife or nurse.
- Able to provide phone or radio advice.
- Equipped with portable battery-operated monitors (ECG, heart rate, respiratory rate, oxygen saturation) and suction. Possible to provide hand bag ventilation by face mask or endotracheal tube rather than have a transport ventilator.

Clinical effectiveness and management
- Protocols for admissions, discharges, retrievals, resuscitation and stabilisation, and for treating major conditions.
- Data collection and regular audit of deaths and near-miss cases to improve care provided.

Facilities for families
- Access for carers of children and partners of pregnant mothers at all times.
- Accommodation and food for families.
- Maternal and Child Health Initiative (MCHI) environment (see MCHI manual).

Equipment and drugs
- Essential equipment for the high-dependency care of children and pregnant mothers
  1. Beds that are manually operated to tilt the head up or feet down.
  2. Wedges for lateral tilt for pregnant mothers.
Section 1.15

Pain control in pregnancy and childhood

Introduction

It is ethically wrong and a failure of professional duties for any patient to suffer uncontrolled pain.

- Uncontrolled pain has adverse cardiovascular, respiratory, immunological and metabolic consequences, as well as long-term psychological effects.
- Both pharmacological and non-pharmacological approaches are valuable in both acute and chronic pain.
- Attempts should be made to anticipate and prevent pain rather than trying to relieve it when it is established. This method usually results in less analgesia being needed. ‘As-required’ regimens should be avoided. Analgesics should be used in regular and adequate doses.
- There is little place for IM pain relief, particularly as a repeated treatment. Many patients would rather suffer and hide their pain than receive IM analgesia.
- If a conscious child has to be restrained for a procedure, this must be done kindly but firmly by a person or persons (ideally a parent or caregiver) and not by contraptions such as straitjackets or the tying down of limbs.
- It is vital to ask for and value the patient’s own judgement concerning the adequacy of pain relief provided.
- When beginning a course of treatment for pain it is important to realise that such treatment may continue for a long time. Pain must be controlled quickly from the onset to ensure confidence in treatment, with an emphasis on preventative measures.

Assessment of pain

- Establish the severity of pain that is being experienced.
- Help to select the right amount and type of pain relief.
- Indicate the success of pain management.

Methods for assessing pain

- Description by the patient (self-reporting), possibly involving the use of a self-report scale (see Figures 1.15.1 and 1.15.2)
- Observation of behavioural changes (e.g. crying, guarding of the injured part, facial grimacing). This method is best for children in collaboration with carers. The Alder Hey Triage Pain Score may be useful in this context (see Appendix on p. 80).
- Physiological changes (e.g. vasoconstriction, tachycardia, tachypnoea). However, these can also be due to serious medical causes.
- Expectation of pain because of the pathophysiology involved (e.g. obstructed labour, placental abruption, fracture, burn or other significant trauma).
- Keeping a diary of long-term pain.

FIGURE 1.15.1 Visual scale for assessing the severity of pain.