

## Patient and Nurse Controlled Analgesia



### Patient Controlled Analgesia (PCA)

Children from approximately 6 years of age may be able to use PCA if their pain is  $> 4/10$  or in anticipation of a painful event e.g. movement, dressing, removal of drain. To be a candidate for PCA, patients must be able to understand the relationship between pain, pushing the PCA button and pain relief. Exclusions may be delayed development and some physical disabilities.

It is important for parents to realise that it is **patient-controlled and not parent-controlled analgesia**.

### Nurse Controlled Analgesia (NCA)

Nursing staff may deliver an additional bolus from the infusion pump if they assess that a child is in pain or prior to a painful procedure e.g. movement, dressing change, removal of drain.

**PARENTS MUST NEVER PRESS THE PCA/NCA BUTTON** to give a bolus to their child. To do so can potentially result in over sedation and respiratory depression with potentially fatal consequences.

The variable weight of children means that the concentration in the syringe is individually chosen for the patients. A dose of:

**Neonates and Infants  $<5\text{KG}$ :**  $0.5\text{mg/kg}$  to a total of  $50\text{ml}$  in Glucose  $5\%$

**Concentration  $1\text{ml} = 10\text{microgram/kg/ml}$**

**Bolus dose:**  $1\text{ml} = 10\text{ microgram/kg/ml}$

**Background rate  $0.5\text{ml} = 5\text{microgram/kg/hr}$**

**Lockout time:** 20minutes

**Children  $>5\text{kg}$ :**  $1\text{mg/kg}$  morphine to a total of  $50\text{mls}$  glucose  $5\%$

**Concentration  $1\text{ml} = 20\text{microgram/kg/ml}$**

**Bolus dose:**  $1\text{ml} = 20\text{microgram/kg/ml}$

**Background Rate:**  $0.5\text{mls/hr} = 10\text{mcg/kg/hr}$

**Lockout time:** depending on age but never less than 5 minutes

### PCA/NCA Vital Sign Recordings

Hourly respiration and sedation score should be recorded for the first 12 hours then 4 hourly if stable, **unless a basal infusion rate is used in which case hourly observations should continue.**

Pain scores can be omitted in sleeping patients.

**AVPU sedation scores must be continued even when the child is sleeping.**

## Loading Dose

It is important to realise that PCA/NCA is essentially a maintenance therapy, it will not be effective if moderate or severe pain is present when it commences.

To make the patient comfortable before PCA is started a loading dose of the opioid is needed. There is an enormous inter-patient variation in the amount of opioid required as a loading dose and this will need to be individualised for each patient. In OLCHC most children will receive their loading dose intraoperatively.

## Bolus Dose

The bolus dose is the amount of opioid that the PCA/NCA pump will deliver when the demand button is pressed. The size of the incremental dose along with the lock out interval can determine the effectiveness of PCA. The aim is to give good analgesia with a minimum of side effects.

## Lock out Interval

The time from the **end** of the delivery of one dose until the PCA/NCA pump will respond to another demand is called the "lock out" interval. This is to allow the effect of one dose to be felt before another can be given and is one of the safety features of the PCA pump. If analgesia is inadequate it is better to **increase the bolus dose** rather than **decrease the lock out interval**.

## Continuous background infusion (Basal rate)

The purpose of a continuous infusion (basal rate) is to help maintain a stable analgesia level. It is also hoped the continuous infusion will enable the patient to make fewer demands, sleep for longer periods and wake in less pain.

Key to the safe use of basal rate infusions is close nurse monitoring of sedation and respiratory status.

## Demands /Attempts

Records the number of attempts (demands) by the patient as opposed to the number of doses delivered. Individual (not cumulative) hourly demands should be recorded.

If PCA/NCA does not seem to be providing adequate analgesia it is worth looking at the average number of doses the patient has received over the preceding few hours.

If the child is not using PCA effectively he/she needs further instruction and the patient should be encouraged to use the PCA more often. On the other hand if the patient is already receiving three four or more doses each hour the size of the bolus dose may need to be increased by 50 – 100%.

The background rate may need to be increased within prescription limits only if a child receives more than 3 boli per hour for 2 hours in row. **When a child is in pain, it is safer, quicker and more effective to deliver an additional bolus.**

## 4 Hourly Limit

The maximum amount of medication (opioid) that the pump will deliver in any four hours (excluding loading doses).