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Extended Research Article

High-flow nasal cannula therapy versus continuous positive airway pressure for non-invasive respiratory support in paediatric critical care: the FIRST-ABC RCTs

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Plain language summary

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Plain language summary

Non-invasive forms of breathing support, mainly continuous positive airway pressure and high-flow nasal cannula, are used commonly in children's intensive care units. High-flow nasal cannula is easier to use, requires less nursing input and is more comfortable for children. However, few clinical trials have compared their effectiveness in sick children.

The aim of the FIRST-line support for Assistance in Breathing in Children clinical trials was to test if high-flow nasal cannula was non-inferior (not unacceptably worse) compared to continuous positive airway pressure in terms of how quickly children were able to come off breathing support, and whether high-flow nasal cannula provided value for money for the National Health Service. The trials were carried out in two groups of children in whom doctors usually start non-invasive breathing support: (1) acutely ill children and (2) children coming off a ventilator.

A total of 1200 children (600 acutely ill and 600 following extubation) were entered into the trials. Half were randomly assigned to high-flow nasal cannula and the other half to continuous positive airway pressure.

Complete information was available in 573 of 600 acutely ill children included in the trial. The average time taken to come off all breathing support was 5 hours longer with high-flow nasal cannula, judged as acceptable considering its benefits (fewer children on high-flow nasal cannula needed sedative medicines and developed pressure sores in the nose, and children spent a shorter time in hospital).

Complete information was available in 553 children of 600 children needing breathing support following extubation. Average time taken to come off all breathing support was 8 hours longer with high-flow nasal cannula, not considered an acceptable difference, since there were few benefits of using high-flow nasal cannula. On average, high-flow nasal cannula saved a small amount of money for the National Health Service.

The FIRST-line support for Assistance in Breathing in Children trials showed that high-flow nasal cannula was an acceptable first choice in acutely ill children needing breathing support, but continuous positive airway pressure was the most effective first choice in children needing breathing support after extubation.

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