Car seat challenge – the current practice

This article is about car seat challenge testing in high-risk babies prior to discharge from the neonatal unit. It also includes a national survey which involved contacting 30 tertiary units throughout the UK to find out the practice which was being followed. The survey indicates a lack of uniformity, both in the test itself and actions consequent to it.

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Key points

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1. The car seat challenge assesses if preterm babies are prone to episodes of apnoea, bradycardia or desaturation when seated in their car seat at discharge.
2. There are no national guidelines.
3. The survey highlights the absence of any standard practice among hospitals to perform this test on their babies prior to discharge.
4. There is a need for further research to validate the test.

Safe transportation following discharge from hospital has always been a cause of concern in infants, especially preterm and low birthweight infants. Physiological monitoring studies have indicated that some preterm infants experience episodes of oxygen desaturation, apnoea, or bradycardia when seated in standard car safety seats[1]. The American Academy of Paediatrics recommends that all preterm infants have a car seat challenge before discharge[2]. Currently some hospitals in the UK practice the car seat challenge test (CST) to assess the cardiorespiratory stability of infants prior to discharge from the neonatal unit. This screening test has been incorporated into discharge assessments in most neonatal units in North America and is being increasingly used in the UK and elsewhere[3].

The CST assesses whether preterm infants who are ready for discharge are prone to episodes of apnoea, bradycardia or desaturation when seated in their own car seat. The result of this test therefore helps to decide whether or not it is safe for the infant to travel in the car seat or whether an alternative mode of transportation should be considered. Following discharge from the hospital, the recommended mode of carriage for neonates and young infants travelling by car is in the semi-upright position in a rear-facing safety seat with a three- or five-point harness[4]. However it has to be noted that most car seats are usually designed for average term babies and may not be suitable for the preterm low birthweight infants[1]. It is therefore important to maintain the correct positioning of preterm infants in the car seats to maximise their safety[1]. Studies have shown that the CST does help to identify infants at risk of oxygen desaturation[5].

Although the CST is performed in many neonatal units, it is not accepted as the gold standard for assessing the risk of respiratory compromise in a car seat after discharge[6]. There are no national guidelines about the method of monitoring infants during the test, the length of the test and what should be done in case an infant fails the test. The only guidelines available are those laid down by the American Academy of Paediatrics[2,4,7]

Methodology

A local audit was initially carried out to determine the current practice at the Princess Royal Maternity hospital (PRM), Glasgow. PRM is a large tertiary unit, delivering 6,000 infants per year with approximately 500 admissions to the neonatal unit. The CST has been included in the routine predischarge check for selected infants for over five years.

The eligibility criteria include:

- infants with a diagnosis of chronic lung disease (CLD) (persisting oxygen requirement beyond 36 weeks' corrected age)
- all infants with a birthweight of <1.8 kg
- infants with a birthweight of <2.5 kg or <34 weeks' gestation if admitted to the neonatal unit for >24hr
- infants with hypotonia – for example due to a congenital anomaly, birth asphyxia or serious illness
- infants with head and neck anomalies which may be associated with an unstable airway e.g Pierre-Robin sequence
- any infant at the consultant's discretion.

This test is generally carried out 2-7 days prior to discharge in the infant's own car seat. The infant is monitored for an hour watching for any episode of apnoea, desaturation or bradycardia. Observations are recorded at 15 minute intervals. On rare occasions, when parents fail to get their own car seat, a hospital one is used.

An infant fails the test if:

- an apnoeic episode occurs – CST is abandoned
- the baseline saturations fall below 92%
- two episodes of desaturations <80% are observed, each lasting for 4 seconds
- significant increase in oxygen requirement is noted (for infants going home on oxygen).

Details of infants who were discharged from March 2007 till December 2007 were examined and 64 babies were randomly selected from all the babies who fitted the eligibility criteria. The results of the audit showed that although the test was performed efficiently on all eligible infants, no standard protocol existed for the infants who did not pass the test. There was no clear plan about what action to be taken if an infant failed the test, what advice should be given to the parents and when to repeat the test. Of the 17% infants who failed the test, nearly half of them were retested either the same day or the next day. One infant was sent home without repeating the test with verbal advice to parents.

It was therefore decided to conduct a national survey to ascertain the practice in other neonatal units. Thirty tertiary neonatal units were contacted throughout the UK. The hospitals selected were widespread across the country and most of them were leads for their neonatal network. A telephone interview was carried out with the nurse in charge or the on-call doctor.

Questions asked were:

- Did the unit perform a CST on their preterm infants before discharge?
- If yes, what were the inclusion criteria?
- What was the duration of the test?
- What was the plan of action if an infant failed the test?
- Was there any written protocol available?

Results

- All the units contacted agreed to participate in the survey
- Nine of the 30 units contacted performed the test (30%)
- One of nine hospitals had a written protocol for the test (3.3%)
- Seven of nine hospitals (77.8%) performed the test only on infants going home on oxygen
- One of nine hospitals (3.3%) performed the test only on infants with CLD and cleft palate
- One of 30 hospitals gave only verbal advice regarding safe transportation of the infant, but did not actually perform the CST and was therefore considered as a negative result.

The duration of the test itself varied from 30 to 60 minutes with one of the hospitals performing the test for double the time required for the infant to reach home.

Discussion

This study was mainly carried out to determine the national practice for CST. The results showed that only a third of the neonatal units participating in the survey are currently performing this test and even among them there is no standard practice. Furthermore there are no national guidelines available for the CST. However, it should be borne in mind that this is a small study, and so it doesn't give a complete picture about the national practice.

According to Tonkin et al, preterm infants when placed in car seats have increased incidence of oxygen desaturation than when placed in cribs or in supine car beds[8]. Most of these infants are very young and haven't developed head control by the time of discharge. Due to their relatively large head and prominent occiput, they tend to flex their head when made to sit in a car seat, especially when they are asleep, because of the relaxation of the pharyngeal muscles[9]. CST helps to identify the at-risk infants prior to discharge[7].

The standard recommendation is that the test should be performed for at least an hour to be able to pick up any desaturations. This requires a significant amount of nursing staff time. There is generally a high level of parental anxiety involved during the discharge of a preterm and if the infant fails the test, it adds to this anxiety. A negative test can also occasionally delay discharge from the hospital, which can in turn affect the overall cot occupancy and add to the overall NHS budget. On the other hand, a 'pass' test may occasionally give parents a false sense of security. It is very important for parents to understand that passing CST doesn't exclude the risks of clinically significant incidents and it is vital that infants are monitored for the entire time that they are in a car seat. Families should minimise travel for infants at risk of respiratory compromise[2,4].

The Cochrane database states that it is unclear whether this test is able to predict accurately the risk of clinically significant adverse effects in preterm infants travelling in their car seats. Their review could not find any randomised controlled trials that assessed the diagnostic utility of the CST in discharge assessment of preterm infants[1]. Also some studies have shown that there is no evidence that babies are less likely to have an event in a car bed than in a car seat[10].

What then is the safest mode of transportation for preterm infants? Some studies done so far have shown that CST does help to identify the at-risk infants prior to discharge[11]. Therefore it would be useful to have national guidelines.

These guidelines should include:

- the eligibility criteria for the test
- information and advice leaflets for parents
- pass/fail criteria
- steps to be taken if an infant fails the test
- when to repeat the test.

Simple steps that can be taken if an infant fails the test include:

- repositioning the infant in the car seat (to minimise neck flexion)
- repeating test after 5-7 days (infant a little more mature)
- using an alternative mode of transportation if an infant fails the test more than once, plus documenting the need for further investigations to find a cause
- repeating test at three months of age in infants who were sent home in a car cot/crib.
- training parents in basic life support skills.

Conclusion

The CST is not an established routine pre-discharge check in the UK. Once a protocol is put in place it is then possible to ensure that all eligible infants are subjected to the test. It is neither clear from the literature nor from the targeted survey regarding the exact procedure for the test and what measures should be taken for those infants who fail the CST. The CST is a time-consuming procedure, which may occasionally delay a discharge. If this test is to have any place in the routine pre-discharge check for preterm infants it should be standardised and validated.

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