Table 2 Details of articles found

Citation	Study group	Study type	Outcome	Key results	Comments
Watkins and Keogh (1992) ³	Case reports of 2 patients who sustained skin burns following the use of alcoholic skin preparation	Case report	None specified	Chemical burns from skin preparation	Extremely low birth weight infants have high skin permeability Major burns are possible after brief exposure to solution Care is needed in the selection of such solutions Great care must be taken to avoid pooling of the cleanser under the infant Saline must be used for cleaning the immature skin
Reynolds <i>et al</i> (2005) ⁴	Case reports of 2 patients who sustained extensive abdominal burns following the use of 0.5% chlorhexidine in 70% methanol	Images in neonatal medicine	None specified	Morbidity from skin burns	The solution does not cause skin damage in the extreme preterm infant Although absorbed by the skin it is extensively metabolised The overall rate of catheter related bacteraemia was low at 0.25%
Buhrer <i>et al</i> (2002) ⁵	24 preterm babies had 2% phenoxylethanol and 0.1% octenidine as antiseptic for skin preparation	Prospective trial	Transient erythematous skin reaction was noted in the 23 week babies	One infant had culture proven sepsis Urinary concentration of 2-phenoxylethanol was 12-fold versus the original compound in boys	Chlorhexidine based preparations are better than iodine based preparations for decreasing catheter colonisation
Garland <i>et al</i> (1995) ⁶	826 infants were exposed to 10% povidone iodine and 0.5% chlorhexidine sequentially over a 6 month period	Prospective non-randomised trial	Chlorhexidine based preparations are better than iodine based preparations for decreasing catheter colonisation	Incidence of catheter colonisation with chlorhexidine was 4.7% (20/418, $p=0.01$) Incidence with povidone iodine was 9.3% (38/408)	Chlorhexidine based preparation are better than iodine based ones
Hibbard <i>et al</i> (2002) ¹	106 subjects were treated with one or two of three antiseptics (chlorhexidine gluconate plus isopropyl alcohol, 70% isopropyl alcohol, 2% chlorhexidine)	Randomised parallel group open labelled clinical trial	Chlorhexidine gluconate in isopropyl alcohol has better persistent antimicrobial activity than isopropyl alcohol or aqueous chlorhexidine alone	Chlorhexidine gluconate plus isopropyl alcohol provided significantly more persistent antimicrobial activity on abdominal sites than isopropyl alcohol ($p=0.03$) or chlorhexidine gluconate ($p=0.028$) at 24 h	All three antiseptics significantly reduced abdominal and inguinal microbial counts from baseline at 10 min, 6 h and 24 h Chlorhexidine plus alcohol provided more persistent antimicrobial activity

the currently used agents have the potential to cause considerable harm to infants. However, no safer alternative is supported by evidence and this reinforces the need to examine this issue more closely. Research must be carried out to find a safe and effective agent if we are to not make things more difficult for an already challenged population.

CLINICAL BOTTOM LINE

- Extremely preterm infants are at risk of burns from the use of alcoholic skin preparations, but no comparative data are available to suggest the best preparation for this group of patients. (Grade C)
- Making sure there is no pooling seems to be the most effective method of avoiding problems related to skin burns in infants. (Grade C)
- Alcohol based preparations have good antibacterial activity in adults and have an excellent safety profile. (Grade C)

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Should creatine kinase be checked in all boys presenting with speech delay?

Report by

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Jack is a 2.5 year old boy. He has been referred for developmental assessment by his health visitor. His community paediatrician diagnoses speech and language delay. His mother reports he first sat independently at 9 months and walked at 17 months.

Structured clinical question

In a male child with speech delay who walks prior to 18 months old [patient], does requesting serum creatine kinase

Table 3 Results of main articles

Citation	Level of evidence	Study group	Outcome	Key results	Comments
Parsons <i>et al</i> (2004) ¹	Cohort study 1b	22 boys diagnosed in newborn screening programme 1990–1998	Previously proposed strategies for earlier diagnosis would have had limited effectiveness in the newborn screening group	Not walking at 18 months: 22% Speech delay at 24 months: 56% Awkward gait at <4 years: 94%	Analysed suggested screening criteria Used Griffith scales, developmental milestones, case reviews and parental report
Mohamed <i>et al</i> (2000) ²	Retrospective case note review 4	21 boys attending a regional paediatric neuromuscular clinic 1995–1998	Diagnosis remains delayed Previous analysis in 1995 from the same clinic showed mean age of diagnosis of 4.5 years in a total of 51 boys	Mean age of diagnosis: 3.2 years When neonatal diagnosis excluded, mean age rose to 4.5 years 72% had been seen by another hospital or community doctor prior to the diagnosis being considered	Suggests clinical criteria that should justify a CK measurement
Cotton <i>et al</i> (1998) ³	Meta analysis 2a	1224 children with muscular dystrophy	Looked specifically at verbal and performance IQ Results suggested no significant difference overall but considered the possibility of subgroups within the muscular dystrophy population with lower than expected language scores	Impairments reported in language scores Population mean IQ in DMD 1 SD lower than in normal population	Highlighted the influence that motor co-ordination may have on IQ tests
Smith <i>et al</i> (1989) ⁴	Cohort study 1b	19 930 participants	Picked up 2 affected boys	1.7% not walking at 18 months. CK checked in 61%	Concluded that population based screening had unacceptably low yield
Dorling <i>et al</i> (2001) ⁵	Case study 5	Analysis of a case of a boy with delayed walking	Calculated the risk of a boy not walking at 18 months having DMD as 1:228		Gives a cost benefit analysis for checking CK
Essex <i>et al</i> (2001) ⁶	Case series 4	3 patients	In the authors opinion a late diagnosis of DMD is especially likely in boys with a considerable learning difficulty who present with global delay	In each case the delay to diagnosis was felt to be unacceptable All three children had significant language delay	Small case series highlighting reasons for late diagnosis

CK, creatine kinase; DMD, Duchenne muscular dystrophy.

[intervention] help diagnose Duchenne muscular dystrophy with reasonable efficiency [outcome]?

Search strategy and outcome

PubMed: “Duchenne muscular dystrophy,” “speech delay”, combined with “screening” and “language”. Sixteen references were found in total.

OMIM database and specific journals: The titles and the abstracts were reviewed. Eleven studies were relevant; seven articles were selected as directly related to the question.

Searches were carried out in August 2006.

See table 3.

Commentary

The early diagnosis of Duchenne muscular dystrophy (DMD) in the male child with developmental delay is a frequent concern in community paediatric practice. Many criteria have been suggested as “triggers” to screen for the condition. Most focus on delayed motor milestones as this has been clearly shown to be symptomatic of DMD. Other criteria have included speech delay.

These parameters appear to be robust when followed prospectively in a cohort of affected boys in the Newborn Screening Study in Wales. Speech problems in boys with DMD have been extensively researched as the mechanism remains unclear. The Welsh cohort demonstrated that 71% of affected boys failed one or both of the speech and language developmental milestones studied (single words at >13.7 months and meaningful sentences at >29 months). The authors point out

that there was no clear link between late walking and delayed language development in this group.¹

Speech and language delay (SLD) is common and DMD is relatively uncommon. Assuming an incidence of DMD of 1 in 3000 male births⁷ and a prevalence of SLD of 61% in DMD⁸ versus 6% in the general preschool population^{9 10} allows construction of a two-way contingency table.¹¹ The positive predictive value of SLD as a screening tool for DMD is unsurprisingly low (0.34%) and the negative predictive value unsurprisingly high (99.99%) largely because of the low prevalence of DMD. Approximately 300 children with SLD would have to be tested to identify one child with DMD.

It is important to note that a number of boys with DMD will have normal speech development and up to 70% walk at 18 months. At presentation boys may report more non-specific symptoms such as cramps, leg pains or clumsy gait; it is worth specific, detailed questioning of parents of boys with speech delay to elucidate these subtle symptoms.

CLINICAL BOTTOM LINE

- Speech and language delay (SLD) in Duchenne muscular dystrophy (DMD) is ten times more common than in the general population (~60%). (Grade C)
- Approximately 300 boys with SLD would need creatine kinase (CK) tests to diagnose one with DMD. (Grade C)
- Any subtle signs or symptoms of locomotor delay should prompt serum CK testing. (Grade D)

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