COMPARISON OF RESULTS OF TWO APPROACHES TO HIP SCREENING IN INFANTS

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We compared the success of the screening programmes for congenital dislocation of the hip in two hospitals in the same district, as applied to 68,861 live births over 11 years. Both used only clinical tests on new-born infants. Screening was less successful when the tests were done by junior paediatric physicians than by senior physiotherapists supervised by an orthopaedic surgeon.

Clinical screening can be highly effective provided that all babies are screened at birth, and high-risk cases are followed up by a properly trained team with a well-designed protocol.

Early splinting of unstable hips reduces the incidence of subsequent dislocation (von Rosen 1962; Hadlow 1988). Screening programmes aimed at the earlier identification of hips at risk would therefore seem worthwhile but the value of screening has been questioned (MacKenzie and Wilson 1981; Catford, Bennet and Wilkinson 1982). Screening is more effective when performed by experienced and enthusiastic assessors (Bernard et al 1987; Macnicol 1990). The Standing Medical Advisory Committee in the United Kingdom (DHSS 1986) recommended the appointment of a designated officer to oversee screening programmes, but did not specify who should perform the examination. Less than half the health districts of the UK have appointed a designated officer (Jones, Beynon and Littlepage 1991). More screening of new-born infants is done by paediatricians than by orthopaedic surgeons (Moss et al 1991), but there have been no studies directly comparing the success of screening programmes by the two specialties.

We have analysed the results of the different screening programmes in two maternity units within the same district over an 11-year period.

METHODS

Screening systems

Hospital 1. All new-born infants are examined by a member of the paediatric medical team. An orthopaedic opinion is sought only for children with clinically suspicious hips. There is no system for reviewing infants who had a breech birth or a family history of hip disorders or congenital abnormalities known to be associated with a higher risk of congenital dislocation of the hip (CDH). Hospital 2. The screening programme is supervised by an orthopaedic surgeon. All new-born infants are seen by one of two senior physiotherapists. A register of births is kept, and any infants discharged before being seen, such as over a weekend, are examined subsequently. Every two weeks follow-up clinics are held, at which all infants 'at risk' are reviewed; these include those with suspicious hips on first screening, those who had breech deliveries or caesarean sections for abnormal lie, those with moulding defects and other leg abnormalities such as talipes, and those with a family history of CDH. If there is a serious suspicion of dislocation, an anteroposterior radiograph is taken at three months, followed, if necessary, by arthrography and open reduction. A radiograph is taken of suspicious and 'at risk' hips at approximately seven months.

Splinting. All patients suspected of having hip abnormalities, from both hospitals, are seen by one orthopaedic surgeon (NSPD). Infants with hips which are dislocated or dislocatable within four days of birth are treated by a loose von Rosen splint for 12 weeks. The splint is then removed and the child reviewed four weeks later.

Some infants are found to have 'slidy' hips (Bernard et al 1987) at birth. They are reviewed at three days, and are splinted if the hip is still thought to be abnormal. Infants with limited abduction are not splinted, but are followed with all other 'at risk' hips as described above. All children who have been splinted are reviewed at 14 months, and are radiographed at two years.

Ultrasound. Since 1989 all infants whose hips are doubtful at birth have an ultrasound examination performed within 72 hours. Children with 'at risk' hips which are clinically normal attend an ultrasound clinic at six weeks.
Table 1. Total live births for each year in each unit and the number and percentage of infants whose hips had open reduction

<table>
<thead>
<tr>
<th>Year</th>
<th>Hospital 1</th>
<th>Hospital 2</th>
<th>Splinted*</th>
<th>Hospital 2</th>
<th>Hospital 1</th>
<th>Hospital 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>3120</td>
<td>3094</td>
<td>50</td>
<td>4 (0.128)</td>
<td>4 (0.129)</td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td>2796</td>
<td>2993</td>
<td>46</td>
<td>2 (0.072)</td>
<td>2 (0.067)</td>
<td></td>
</tr>
<tr>
<td>1982</td>
<td>2667</td>
<td>3064</td>
<td>32</td>
<td>1 (0.037)</td>
<td>2 (0.065)</td>
<td></td>
</tr>
<tr>
<td>1983</td>
<td>2746</td>
<td>3183</td>
<td>42</td>
<td>1 (0.036)</td>
<td>0 (0.000)</td>
<td></td>
</tr>
<tr>
<td>1984</td>
<td>2685</td>
<td>3319</td>
<td>40</td>
<td>1 (0.037)</td>
<td>1 (0.030)</td>
<td></td>
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<tr>
<td>1985</td>
<td>2761</td>
<td>3672</td>
<td>46</td>
<td>1 (0.036)</td>
<td>1 (0.027)</td>
<td></td>
</tr>
<tr>
<td>1986</td>
<td>2863</td>
<td>3740</td>
<td>45</td>
<td>2 (0.070)</td>
<td>4 (0.011)</td>
<td></td>
</tr>
<tr>
<td>1987</td>
<td>2921</td>
<td>3618</td>
<td>31</td>
<td>2 (0.068)</td>
<td>1 (0.028)</td>
<td></td>
</tr>
<tr>
<td>1988</td>
<td>2867</td>
<td>3511</td>
<td>49</td>
<td>1 (0.035)</td>
<td>1 (0.028)</td>
<td></td>
</tr>
<tr>
<td>1989</td>
<td>2948</td>
<td>3609</td>
<td>49</td>
<td>0 (0.000)</td>
<td>0 (0.000)</td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td>2976</td>
<td>3708</td>
<td>38</td>
<td>0 (0.000)</td>
<td>1 (0.027)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>31350</td>
<td>37511</td>
<td>468</td>
<td>15 (0.048)</td>
<td>17 (0.045)</td>
<td></td>
</tr>
</tbody>
</table>

* figures not available for hospital 1

RESULTS

From 1980 to 1990, there were 31350 live births in hospital 1 (paediatric medical screening) and 37511 live births in hospital 2 (physiotherapist screening); 15 children from hospital 1 and 17 from hospital 2 eventually required open reduction (Table 1). All reductions were by the medial (Ludloff) approach (O’Hara, Bernard and Dwyer 1988) and the ages at diagnosis of these children are shown in Figure 1. We know of no infants born in either unit who subsequently underwent open treatment elsewhere (Bernard et al 1987).

In 1990 there were 908 appointments booked for infants to attend the ‘at risk’ clinic. The non-attendance rate was 26%, but most of these infants did attend at later appointments, and the number who never attended for ‘at risk’ review was under 7%.

A ‘missed’ hip is defined as one not diagnosed within 48 hours of birth and afterwards found to be dislocated. There were ten missed hips from hospital 1 (paediatric medical screening) and three from hospital 2 (physiotherapist screening).

Of those missed at hospital 1, two were diagnosed by their general practitioners, one at three months and the other at 19 months of age. One infant had urinary abnormalities and was diagnosed while undergoing intravenous urography at three months. Three were diagnosed in paediatric clinics at two, three and five months. The remaining four infants were noticed by their family to be limping and were actually diagnosed at 15, 17, 23 and 34 months.

Of the three cases missed at hospital 2, one infant was severely distressed after caesarean delivery, and missed being screened while in the special care baby unit. The diagnosis was made at a regular paediatric review clinic at 18 months. One was discharged over a weekend and missed being screened. Her hip abnormality was missed at all the paediatric assessment clinics, until she was noted to be limping at 20 months of age. The third infant had bilateral club feet. Her hips were thought to have been normal at birth, but in accordance with the protocol, she had a pelvic radiograph taken at eight months which showed the dislocation.

All splinted infants had a radiograph of the hips at two years, and we have not yet found any evidence of damage from our splinting. There has been no case of osteonecrosis after surgery.

No ‘at risk’ infant with a clinically normal hip has yet been shown to have an abnormality by ultrasound.

DISCUSSION

The aims of a screening programme for CDH are twofold:
1) to detect the dislocation at birth and thereby diminish the need for surgical treatment (Hadlow 1988); and
2) if this is not achieved, to ensure that surgical treatment is performed well before the onset of walking, so that it is simple and effective.

To achieve the first of these aims, dislocated or dislocatable hips should be detected within 48 hours of birth and appropriately splinted.

We perform arthrography of any hip which remains dislocated despite prompt conservative treatment. If persistent dislocation is confirmed, the hip is treated by open reduction using the Ludloff approach (O’Hara et al 1988). The aim is to secure concentric relocation well before weight-bearing begins.

The requirements for successful screening are that there should be a reliable test to detect abnormal hips, that this test should be applied to all new-born infants, and that all positive and high-risk patients should be followed up thereafter.

To ensure that the test is properly done requires an enthusiastic and experienced team which should be large

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enough to allow for cover during holidays and sickness, but not so large as to dilute their experience. We have previously shown that there is a learning curve of about five years’ duration (Bernard et al 1987), and the staff therefore must be sufficiently senior to be in permanent positions.

In hospital 1 the incidence of missed CDH was 0.032%. Macnicol (1990) had a similar rate (0.039%). During 22 of the 24 years of his study, screening was performed by junior paediatric staff, but in the two years in which screening was performed by consultant orthopaedic staff only one case was missed in approximately 9000 infants screened.

In hospital 2 only one child whose hips were thought to be normal on clinical screening was later found to have a dislocation. She was born before we began to use ultrasound and her diagnosis was delayed until she was radiographed at eight months. This experience compares favourably with that of Hadlow (1988) who reported two missed cases out of 20,657 live births screened, subsequently diagnosed at 15 and 18 months.

The other two ‘missed’ hips from hospital 2 were never screened. Unless all infants are screened, CDH will still be diagnosed late whether the test is clinical or by ultrasound (Clarke, Clegg and Al-Chalabi 1989). The failures of the programme in hospital 1 were due in part to failure to screen, but also to lack of skill in the application of the clinical tests.

To achieve precision requires a long period of constant practice (Bernard et al 1987) and we suspect that this will prove to be the case with ultrasound as well as clinical examination.

Our overall operation rate may appear higher than in some other series, but if manipulation and adductor tenotomy are included in the operated groups of other series, then our results are comparable.

**Conclusions.** If all infants are screened at birth and those at high risk are followed up by an experienced team, the rate of late diagnosis (more than one year) is very low. If the screening programme is more loosely organised, more dislocated hips are missed, and more cases are diagnosed after the onset of weight-bearing.

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**REFERENCES**


