assume that some pulmonary insult occurred during the first operation that predisposed to the subsequent arrest. We no longer perform prophylactic nailing of a second femur during the same admission, and delay the second operation for as long as possible. As yet we have been unable to detect changes in basic pulmonary function after unilateral surgery, but feel that further research is needed to offer guidance on a minimum safe interval.

We conclude that caution should be exercised in these cases and that adequate counselling of patients and relatives is needed before surgery. Bilateral operations in particular should be carefully considered, and perhaps should only be performed when there are established fractures.

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

REFERENCE

EVIDENCE FOR A VIRAL AETIOLOGY OF TRANSIENT SYNOVITIS OF THE HIP

V. TOLAT, H. CARTY, L. KLENERMAN, C. A. HART

In children a painful hip is commonly due to transient synovitis, but the cause is unknown. We aimed to study the aetiological basis of the condition.

Patients and methods. Over a six-month period in 1991, 80 children were admitted with acute transient synovitis of the hip. The protocol for their management was:
1) Clinical examination.
2) Venous blood samples taken for full blood count, ESR, C-reactive protein (CRP) level, uric acid, rheumatoid latex tests, interferon levels and viral serology.
3) Synovial fluid samples, taken when ultrasound had detected an effusion and studied for type of cell, bacterial culture, viral culture and interferon levels.
4) Recall after three to four weeks for clinical examination and to take samples for convalescent viral titres.

Interferon levels were tested in the serum and in the synovial fluid by the ELISA test (GIBCO BRL, Uxbridge, UK). Viral serology was by complement fixation using antigen supplied by the Public Health Laboratory Service (Colindale, London, UK). The pathogens tested for were enterovirus, adenovirus, measles virus, rubella virus, cytomegalovirus (CMV), herpes simplex virus (HSV), Mycoplasma pneumoniae, mumps virus s and v antigens, Toxoplasma gondii and Epstein-Barr virus. Antibodies to the last were estimated by an immunofluorescence test using virus-infected cells.

An infective agent was considered to be present when there was:
a) a fourfold or greater rise from the acute to the convalescent viral titres;
b) a high titre to an infective agent; or
c) the presence of a pathogen detected by culture or antigen methods.

Statistical analysis was by the paired and unpaired Student's t-test.

Results. White cell counts did not show great variation from normal, but 17 patients had a tendency to lymphocytosis. Of these, 14 (82%) had raised interferon levels or positive serology. The ESR varied widely (0 to 53 mm/hr) from the normal range of 3 to 7 mm/hr. The CRP level was within normal limits for all but two patients, both of whom had a concurrent ear infection. It was not possible to carry out serological tests on all patients as it was difficult sometimes to collect the required amount of blood.

Twenty-eight of 65 patients (43%) had raised blood interferon levels. Fifteen of the 16 patients with an effusion which was successfully aspirated (94%), showed raised interferon levels in the synovial fluid. These did not necessarily coincide, however, with raised levels in the blood. Bacterial and viral cultures of all synovial fluid samples were all negative. Cells were difficult to identify, because of admixed red blood cells and the small volumes available.

Viral serology in 67 patients showed raised antibody titres to viruses (Table 1). By the criteria given above, pathogens were detected in:
a) 8 patients with fourfold or greater increase in titre to M. pneumoniae, enterovirus or mumps;
Table I. Results of viral serology in 67 children with transient synovitis of the hip

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Percentage of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-specific positive</td>
<td>46.2</td>
</tr>
<tr>
<td>Mycoplasma</td>
<td>12.8</td>
</tr>
<tr>
<td>Rubella</td>
<td>10.3</td>
</tr>
<tr>
<td>Enterovirus</td>
<td>9.0</td>
</tr>
<tr>
<td>Epstein-Barr</td>
<td>7.7</td>
</tr>
<tr>
<td>Mumps virus</td>
<td>6.4</td>
</tr>
<tr>
<td>Adenovirus</td>
<td>5.1</td>
</tr>
<tr>
<td>Measles virus</td>
<td>2.6</td>
</tr>
</tbody>
</table>

b) 9 with high titres to more than one pathogen; c) 7 with a raised titre to Epstein-Barr virus; and d) 12 with high titres to only one pathogen.

Thirty-six patients had no serological evidence of infection, and of these, 26 (76%) had normal blood interferon levels.

Discussion. It is clear that the interferon system is an important part of the defence against viral infections (Levin 1983). Interferons are a group of cytokines (glycoproteins) secreted by cells in the body after stimulation by various antigens and micro-organisms, especially viruses, and they act as messengers to activate the immune system. The entry of a virus into a cell leads not only to replication of the virus, but to the production of interferon which is secreted within hours into the surrounding media. This could be the pathological basis of our finding that synovial fluid interferon levels were raised in almost all the samples tested. Such local production could be the first response to any viral infection.

Leibowitz et al (1985) found that blood interferon levels were significantly raised in 40% of patients with acute transient synovitis. In normal healthy subjects these levels are usually not measurable, but various viral diseases cause significantly raised concentrations. Our findings for blood interferon levels agree with those of Leibowitz et al and help to confirm that the interferon system is activated in transient synovitis. In addition, our study has demonstrated raised interferon levels in the joint fluid itself.

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

REFERENCES

SCAPHOID FRACTURE AT THE TIP OF A HERBERT SCREW

JOHN STOTHARD, ASHOK KUMAR

The Herbert differential pitch screw has given encouraging results for unstable fracture, delayed union and nonunion of the waist of the scaphoid (Herbert, Fisher and Leicester 1992), and has also been recommended for use in other small bone fragments. Some technical difficulties have been reported (Ford et al 1987; Pring, Hartley and Williams 1987), but to our knowledge scaphoid fracture after the use of a Herbert screw has not been described. Such fractures may result from the tip of the screw acting as a ‘stress riser’, or to late avascular necrosis of the proximal fragment. We report two cases which illustrate these problems.

Case 1. A left-handed 25-year-old man had a successful Herbert screw and graft for nonunion ten months after a fracture of the waist of the scaphoid (Figs 1, 2). Seven years later, he fell from his cycle, landed on his knuckles, and sustained a new fracture (Fig. 3). He was treated in plaster but defaulted from review.

Case 2. A 38-year-old man sustained a fracture through the waist of the right scaphoid (Fig. 4) and was treated in plaster. After three months the fracture had not united, and Herbert screw fixation was performed. There was satisfactory clinical and radiological union at five months (Fig. 5).

Three years later, wrist pain began after heavy manual work, but there was no definite injury. Radiographs obtained later showed probable avascular necrosis of the proximal pole with clearly visible radiolucency around the distal threads of the screw (Fig. 6).

Discussion. Herbert screws are made of titanium and do not need removal; attempted removal is likely to cause...

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