Frequency of sepsis after local corticosteroid injection (an inquiry on 1 160 000 injections in rheumatological private practice in France)

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Abstract

Objectives. The principal aims of this study were to determine the frequency of sepsis after local corticosteroid injection (SALCSI), to compare the results with those of the literature and to determine the main factors leading to a decrease in the frequency of SALCSI.

Methods. A retrospective study was conducted among 69 rheumatologists in private practice. Sixteen items were studied and are reported.

Results. The mean number of years of private practice in rheumatology was 20.9. The total number of CS injections (CSI) was 1 160 000 for an average of 809 CSI per year and per therapist. The mean number of CSI performed by one rheumatologist was 16 800. Fifteen SALCSI had occurred, which corresponds to a frequency of 1/77 300 CSI. The rate of SALCSI for the older rheumatologists was lower than that of their younger colleagues. The frequency of use of corticosteroid packaged in a sterile syringe (CSPSS) was ~85%. Nine out of the 15 cases of sepsis had occurred after the use of CS not packaged in a sterile syringe and six after the use of CSPSS. Thus, the frequency of SALCSI was 1/162 000 after the use of CSPSS and 1/21 000 after the use of CS not packaged in a sterile syringe.

Conclusions. The mean frequency of SALCSI in Paris and the surrounding area was 1/77 300 during the last 21 yr, a decrease since the 1960s and 1970s. This decreased incidence is in part due to the greater experience of the rheumatologist, but even more to the use of CSPSS.

Key words: Sepsis, Corticosteroid injection, Frequency, Rheumatological private practice, France.

Sepsis after local corticosteroid injection (SALCSI) is always feared by the rheumatologist, especially in private practice. Its frequency was evaluated as 1/7000 [1] to 1/10 000 [2] in the 1960s, and 1/16 000 [3] in the 1970s, and had not been studied for many years. The main aims of this study were to determine the present frequency of SALCSI, to compare the results with those of the literature and to find out whether these data showed an improvement compared with previous studies to determine the main factors which led to a decrease in the frequency of SALCSI.

Materials and methods

Sixty-nine rheumatologists in private practice in Paris and the surrounding area answered a questionnaire of 11 items: age, sex, length of private practice, number of corticosteroid injections (CSI) performed per year, number of SALCSI, type of corticosteroid (CS) used and its packaging (in a sterile syringe or not), type of bacteria at the origin of the sepsis, joint involved, nature of pathology treated and existence of sequelae. From these data, five correlations between the practitioner’s age, the number of CSI, the number of SALCSI and the type of CS were studied. On the whole, the results of 16 items are reported. The number of CSI per year was calculated with three methods: retrospective from computer data, prospective from data of 1 month of practice × 11 months or retrospective and approximate. The percentage use of corticosteroid packaged in a sterile syringe (CSPSS) was predetermined: 0%, 5%, 30%, 50%, 70%, >80%. The findings were compared using χ² or Student’s t-tests and a level of P < 0.05 was taken as significant (Statbox software).

Other items involving skin preparation and the use of
sterile gloves were studied, but the results are not reported as no relationship with the incidence of SALCSI was found.

**Results**

The results of answers to the main items are summarized in Table 1. The mean age of the rheumatologists was 51.1 yr. There were 49 males and 20 females, and they had been practising for 20.9 ± 9.8 yr. The total number of CSI was 1 160 000 for an average of 809 CSI per year and per therapist (range 90–3000). The number of CSI was evaluated from retrospective computer data (four times), prospective data (19 times) and approximate retrospective data (46 times). The mean number of CSI performed by one rheumatologist was 16 800. Fifteen SALCSI had occurred, which corresponds to a frequency of 1 SALCSI/77 300 CSI. Fifteen out of 69 (risk = 1/4.6) rheumatologists had a case of sepsis during the course of their private practice. The risk of a therapist observing sepsis increased with the total number of CSI performed, as it was 1/3.3 for the 23 therapists who had performed the largest number of CSI and was only 1/5.8 times ($\chi^2$ = not significant) for the 46 other therapists. The older rheumatologists (>60 yr) performed a larger number of CSI per year than the younger ones (<45 yr): 1160 vs 711 CSI per year. The rate of SALCSI in the older rheumatologists was lower than for their younger colleagues: 1/112 000 vs 1/35 000 ($P < 0.05$). The frequency of use of CSPSS was 70–100% in 61 out of 69 rheumatologists. Two therapists had never used CSPSS and their rate of SALCSI was 1/24 000. Finally, 9/15 cases of sepsis had occurred after the use of CS not packaged in a sterile syringe and six cases after the use of CSPSS. Thus, the frequency of SALCSI after the use of CSPSS was 1/162 000 vs 1/21 000 ($P < 0.005$) after the use of CS not packaged in a sterile syringe. *Staphylococcus* was found 11 times, *Proteus mirabilis* once, *Neisseria mucosa* once, enterobacteria once, and the type of bacteria was unknown in one case. The knee was involved seven times, the shoulder three times, and the elbow, the spine, the hip, the interphalangeal joint and the metatarsopha-
langeal joint once each. Sequelae occurred in one case. The CSI were performed to treat osteoarthritis (seven cases), tendinitis or bursitis (five cases), post-traumatic arthropathy (one case), sciatica (one case) and rheumatoid arthritis (one case).

**Discussion**

This study was performed retrospectively, as it was obviously not possible to obtain such a number of CSI prospectively. In fact, with a mean of 800 CSI per rheumatologist and per year, one would have needed the data of 1500 practitioners to obtain 1 200 000 CSI. This explains why the frequency of SALCSI had never been evaluated prospectively, to our knowledge, in such a large number of CSI (1 160 000). Only one other retrospective study, presented very recently at the 11th French Congress of Rheumatology [4], has provided a similar incidence (1/71 000) of SALCSI. Comparison between retrospective and prospective data showed a tendency for a higher rate of SALCSI for the rheumatologists who provided retrospective data. In fact, they had a higher rate of SALCSI (1/70 500 vs 1/122 000; $P = 0.14$) and a higher rate of SALCSI per practitioner (1/3.5 vs 1/11.5; $P = 0.06$). This was associated with a higher number of CSI/year (890 vs 630; $P = 0.21$) and was independent of their age [52.1 ± 49.2 yr ($P = $ not significant)]. Seven out of 15 SALCSI were obtained in the first 20 questionnaires returned; this clearly demonstrated that the practitioners who had unfortunately observed this type of serious accident are keenly aware of the importance of this problem. As the interval between CSI and SALCSI is short (less than a week), the link between the painful, red and swollen joint or occurred after the use of CS not packaged in a sterile syringe, the knee was involved seven times, the shoulder three times, and the elbow, the spine, the hip, the interphalangeal joint and the metatarsopha-

### Table 1. Results of replies to the main items of the questionnaire

<table>
<thead>
<tr>
<th>Number</th>
<th>CSI per year</th>
<th>Sepsis per</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rheumatologists</td>
<td>69</td>
<td>809</td>
</tr>
<tr>
<td>Aged &lt; 45 yr</td>
<td>21</td>
<td>711</td>
</tr>
<tr>
<td>Aged &gt; 60 yr</td>
<td>13</td>
<td>1160</td>
</tr>
<tr>
<td>Prospective data</td>
<td>23</td>
<td>630</td>
</tr>
<tr>
<td>Retrospective data</td>
<td>46</td>
<td>890</td>
</tr>
<tr>
<td>CSI</td>
<td>1 160 000</td>
<td>1/77 300 (15.1 160 000)</td>
</tr>
<tr>
<td>In rheumatologists aged &lt; 45 yr</td>
<td>155 500</td>
<td>1/31 200 (5/155 500)</td>
</tr>
<tr>
<td>In rheumatologists aged &gt; 60 yr</td>
<td>452 000</td>
<td>1/113 000 (4/452 000)</td>
</tr>
<tr>
<td>SALCSI</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>CSPSS</td>
<td>972 000</td>
<td>1/162 000 (6.972 000)</td>
</tr>
<tr>
<td>Non-CSPSS</td>
<td>189 000</td>
<td>1/21 000 (9.189 000)</td>
</tr>
</tbody>
</table>

CSI, corticosteroid injection; SALCSI, sepsis after local corticosteroid injection; CSPSS, corticosteroid packaged in a sterile syringe.
as Fitzgerald [5] said: 'To our knowledge no infections in a sterile syringe had never been quantified hitherto. These results should induce health authorities to revise

One could even advocate that this study maximizes the rate of SALCSI. In fact, if the occurrence of one case of SALCSI cannot be forgotten by a rheumatologist, the number of CSI per year was evaluated on their present practice, it is well known that rheumatologists presently perform fewer CSI than 20 yr ago [6]. This is confirmed by the higher rate of CSI per year for the older rheumatologists. For all these reasons, one cannot retain as a statistical skew the retrospective aspect of this study.

Furthermore, the present study confirms classical data of SALCSI (bacteriology, joints involved, pathology treated by CSI) [7–11]. Staphylococcus remains the most frequent (73%) microorganism at the origin of this type of sepsis. The knees and the shoulders are the most frequently (66%) involved joints. Osteoarthrosis, tendinitis and bursitis are the most frequent disorders treated with CSI, and they provided 80% of SALCSI cases. Articular sequelae occurred in only one case, which is much better than in the 1960s [7]. This is due to the rapidity of diagnosis and the progress in antibiotic treatment. The microorganism was identified 14 out of 15 times.

The rate of SALCSI has decreased greatly compared with the data of the 1960s and 1970s [1–3, 5]. This 75% decrease in frequency is linked to the greater experience of the therapist and to the predominant use of CSPSS. Indeed, SALCSI tend to occur in the first 10 yr of practice; this is demonstrated by the lower (1/3) rate of SALCSI in the older therapists (> 60 yr), but even so they had the highest rate of CSI per year. This is largely in accordance with the high incidence of SALCSI found in the 1960s as at that time no practitioner had a long experience of CSI. Since the 1960s, the packaging of the corticosteroid in a sterile syringe has been the most important factor in avoiding infection, as the use of CSPSS divides the rate of SALCSI by 7.7. In fact, only six out of 15 CSLCSI had occurred after the use of CSPSS, when in France in 1997 (and for many years) the share of the market of CSPSS (Altim, Diprostone) was 84% vs 16% for the other drugs (Dilar, Dectancyl, Hexatrione, Hydrocortancyl) when considering only the corticosteroid (Laboratoires Roussel, Schering Plough, Wyeth Lederle) regularly used by rheumatologists. If one takes into account these percentages (84 and 16%) and the number of cases of sepsis (n = 6 + 9), the rate of SALCSI is 1/162 000 (6/972 000) for CSPSS vs 1/21 000 (9/189 000) for other corticosteroids (Student’s t; P < 10⁻⁶). Furthermore, for the two therapists who never used CSPSS, the SALCSI rate was 1/24 000, close to the data of the 1970s. The importance of packaging in a sterile syringe had never been quantified hitherto. These results should induce health authorities to revise their position concerning authorization of non-CSPSS for joint or periarticular CSI, and to induce pharmaceutical companies to package all corticosteroids for CSI in a sterile syringe. Indeed, some of these products remain the reference for some sites (e.g. spine), but involve the highest risk of SALCSI to the patient.

Conclusions

Overall, these data demonstrate a remarkable decrease in the frequency of SALCSI over the last 30 yr and the major advantage provided by the use of CSPSS in avoiding infection. The rheumatologists of Paris and the surrounding area had assumed such an advantage and have used CSPSS for most CSI since 1971, when CSPSS was first offered for sale in France. This study also confirms that the number of CSI presently performed decreased when compared with the 1960s/1970s and demonstrates the positive role of the rheumatologist’s experience.

References