Steroids, non-steroidal anti-inflammatory drugs, and sigmoid diverticular abscess perforation in rheumatic conditions

S Mpofu, C M A Mpofu, D Hutchinson, A E Maier, S R Dodd, R J Moots

Background: Corticosteroids and non-steroidal anti-inflammatory drugs are widely used for the treatment of rheumatic conditions, but their gastrointestinal damage significantly limits their use. Sigmoid diverticular abscess perforation (SDAP) is a very serious complication of diverticular disease.

Objective: To determine the aetiology of large bowel SDAP in rheumatic conditions.

Methods: 64 patients with SDAP and 320 controls from a similar geographical area and of similar socioeconomic status were studied.

Results: The results showed that independently of rheumatic diagnosis corticosteroid treatment is strongly associated with SDAP (OR 31.9 (95% CI 6.4 to 159.2; p<0.001), and non-steroidal anti-inflammatory drugs only weakly associated (OR 1.8 (95% CI 0.96 to 3.4); p=0.069). A rheumatic diagnosis is also strongly associated with the development of SDAP (OR 3.5 (95% CI 1.9 to 6.7); p<0.001).

Conclusions: SDAP has serious implications for patients and consumes many healthcare resources. Patients and physicians should be warned of this potential complication.

Corticosteroids and non-steroidal anti-inflammatory drugs (NSAIDs) have a wide range of side effects in the gastrointestinal tract. Within routine rheumatology practice both treatments are frequently prescribed. Recently, we reported two cases of sigmoid diverticular abscess perforation (SDAP) after corticosteroid treatment in patients with rheumatoid arthritis (RA).1

We have found 13 published reports of rheumatological patients with SDAP and all of these patients had received corticosteroids before the development of this complication.1,3

Myllykangas-Luosujarvi found a sixfold excess mortality in patients with RA as a result of diverticular disease. The author suggested that this increased mortality might be due to a particular drug prescribed in RA.

Corticosteroids are associated with abscess development. In perforated diverticular disease, several small case series have implicated NSAIDs and corticosteroids as possible aetiological factors. Accordingly we suggested that corticosteroids and NSAIDs might be associated with the development of SDAP and that this association would be important both for people with, or those without, a rheumatic disease. To test this hypothesis we undertook a case-control study to determine the importance of corticosteroid and NSAID treatment in the development of SDAP.

RESULTS

Twenty (31%) of the cases died after surgery. Table 1 lists the comorbidity of the case patients and controls.

Overall, 31 (48%) cases had a rheumatic diagnosis compared with only 55 (17%) of the controls (odds ratio (OR) 4.5 (95% confidence interval (CI) 2.6 to 8.0); p<0.001).

Table 2 compares the incidence of SDAP in cases and controls according to their NSAID and corticosteroid treatment.

A significantly higher proportion of the cases than of the controls were taking corticosteroids (10 (16%) v 2 (0.6%); OR 29.4 (95% CI 6.3 to 138.1; p<0.001) and NSAID treatment (27 (42%) v 82 (26%); OR 2.1 (95% CI 1.2 to 3.7); p = 0.008).

Table 3 shows a comparison of rheumatic condition, NSAIDs, and corticosteroid treatment in cases and controls.

When the effects of rheumatic disease, corticosteroid treatment, and NSAIDs on development of SDAP were assessed simultaneously in a multivariate logistic regression model, the association of rheumatic disease and corticosteroid treatment with SDAP remained highly significant (OR 3.5 (95% CI 1.9 to 6.7); p<0.001 and OR 31.9 (95% CI 6.4 to 159.2); p<0.001, respectively) but the association of NSAIDs...
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with SDAP became only borderline significant (OR 1.8 (95% CI 0.96 to 3.4); p = 0.069). Neither of the interaction terms between rheumatic diagnosis and the treatments were significant, which implies that the observed effect of the treatments on SDAP is consistent in both rheumatic and non-rheumatic patients.

**DISCUSSION**

This study has demonstrated that corticosteroid treatment has a strong association, and NSAIDs a weak association, with or without a rheumatic disease. However, rheumatic disease is also strongly associated with development of SDAP. Our findings may, however, explain the association of a greatly increased morbidity and mortality rate from diverticular disease in patients with RA who are prescribed both treatments. The data on patients taking both treatments were sparse, and could not be formally analysed. Among the cases, only one patient was taking both treatments and only three taking two NSAIDs in this study (data not shown). SDAP is a very serious complication of diverticular disease. Accordingly, we observed a very high mortality rate among the cases (31%), which is comparable with the mortality found in a Swedish 12 year study of 392 patients. NSAIDs are known to damage surface epithelial cells and increase colonic permeability. They also inhibit prostaglandins, which are important for maintaining the integrity of mucosal blood flow and responsible for creating an effective colonic mucosal barrier by stimulating secretion of mucus and bicarbonate. Corticosteroids have powerful immunosuppressive actions as well as anti-inflammatory effects and it is likely that these drugs impair the ability to contain a perforation in its early stages. Corticosteroids are associated with abscess formation and, probably, in those patients with diverticulitis, this infective process is worsened by corticosteroid treatment with the development of an abscess that subsequently perforates and is further exacerbated by NSAIDs. Corticosteroids also delay the consecutive healing process. Opiates are known to prolong the exposure of the diverticular wall to pathogens and putative agents by slowing bowel transit time. None of our study cohort cases were receiving opiates.

A number of groups of patients have an increased risk of diverticular abscess perforation. These include renal patients, patients with a lung transplant, and patients with malignant brain tumours, including rheumatic conditions such as dermatomyositis, polyarteritis nodosa, and amyloidosis. Diverticular disease is common, particularly with increasing age, a phenomenon observed in this study group and, consequently, the development of complicated diverticular disease such as diverticulitis and abscess formation is not uncommon.

In summary, we have demonstrated a very strong association between corticosteroid treatment, and a weaker one between NSAID treatment, and the development of SDAP; this association is independent of that observed between rheumatic disease and SDAP. It is important that it is recognised that both treatments are associated with diverticular abscess perforation. Both physicians and patients should be warned of this potential therapeutic complication. There is a great need for research in this disease complication in order to explore and establish its aetiopathogenesis.

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**REFERENCES**


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**Table 1**

<table>
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<th>Diagnosis</th>
<th>Cases (n = 64)</th>
<th>Controls (n = 320)</th>
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<tbody>
<tr>
<td></td>
<td>No (%)</td>
<td>No (%)</td>
</tr>
<tr>
<td>Rheumatoid arthritis</td>
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<td>Dermatomyositis</td>
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<td>Gout</td>
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<td>Polyarteritis nodosa</td>
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<td>Polymyalgia rheumatic</td>
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<td>Osteoarthritis</td>
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<td>COPD</td>
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<td>Hypertension</td>
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<td>Diverticular disease</td>
<td>3 (5)</td>
<td>32 (10)</td>
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</table>

**Table 2**

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Cases (n = 64)</th>
<th>Controls (n = 320)</th>
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<tbody>
<tr>
<td></td>
<td>No (%)</td>
<td>No (%)</td>
</tr>
<tr>
<td>Rheumatic condition</td>
<td>31 (48)</td>
<td>55 (17)</td>
</tr>
<tr>
<td>Corticosteroids</td>
<td>10 (16)</td>
<td>2 (0.6)</td>
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<td>NSAIDs</td>
<td>27 (42)</td>
<td>82 (26)</td>
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**Table 3**

<table>
<thead>
<tr>
<th>Condition</th>
<th>OR (95% CI) p Value</th>
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<tr>
<td>Rheumatic condition</td>
<td>3.5 (1.9 to 6.7) &lt;0.001</td>
</tr>
<tr>
<td>Corticosteroids</td>
<td>31.9 (6.4 to 159.2) &lt;0.001</td>
</tr>
<tr>
<td>NSAIDs</td>
<td>1.8 (0.96 to 3.4) 0.069</td>
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