stones in whom lithotripsy is ineffective, laser treatment can be used. The laser is introduced via a ureteroscope after epidural or spinal anesthesia has been administered. Again, the procedure can be done on an outpatient basis.

RENAL PELVIC STONES

Essentially all renal pelvic stones require intervention, and the new technology has not changed this. These stones usually cause progressive obstruction. Most patients present with pain, though they can also have associated infection and may have a long history of hematuria. These stones are almost always too large to pass spontaneously, but they are usually very amenable to shock-wave treatment.

CALICEAL CALCULI

Caliceal stones can be symptomatic or asymptomatic. Although only symptomatic stones used to be considered for intervention, asymptomatic ones can be considered for intervention as well. Symptoms often arise from progressive obstruction. Frequently, a patient may see several medical services for vague pain in the abdomen, flank, or back. In the past we may not have treated such a patient because cure required nephrolithotomy. Now, however, new technology makes it almost easier to do the treatment (lithotripsy) as a diagnostic test than to subject the patient to any further extensive evaluation looking for other sources of pain.

Small caliceal stones cause problems because they can move at any time and cause acute obstruction. Therefore, "prophylactic" treatment with ESWL can be beneficial even in an asymptomatic patient to prevent acute episodes in the future.

INFECTION-RELATED CALCULI

Struvite stones, composed of magnesium-ammonium-phosphate, are always associated with infection. Left untreated, the natural history is progressive pain, infection, and loss of kidney function. They are more common in women than in men. While they break up very well under lithotripsy, because of their size and shape, they usually require percutaneous treatment, or a combination of percutaneous treatment and ESWL. This again requires an anesthetic, but can often be performed with only a short hospital stay.

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ENTEROPATHIC ARTHRITIS

A number of intestinal diseases are associated with arthropathy, particularly ulcerative colitis, Crohn's disease, dysentery, Behçet's syndrome, and Whipple's disease. This may take the form of a peripheral synovitis or spondylitic spinal changes, or both. Previously thought to be variants of rheumatoid arthritis, the arthropathies of these diseases differ from rheumatoid arthritis in their joint distribution, the lack of subcutaneous nodules, the absence of rheumatoid factor in the blood, and involvement of the sacroiliac joints radiologically.

ULCERATIVE COLITIS

In a study of 269 patients with ulcerative colitis, 15.8% had mouth ulcers, 8.9% had uveitis, 4.5% had skin lesions, and 11.5% had a peripheral synovitis.[1] The synovitis affected mainly large joints of the legs (knees and ankles), occurred more frequently in long-standing and more extensive colitis, and was frequently associated with local complications (such as pseudopolypi and massive hemorrhage) and systemic lesions (such as skin changes and uveitis). Total proctocolectomy abolished the synovitis. Ankylosing spondylitis was found in 12.6% and radiological sacroiliitis in 17%.[2] Whereas peripheral synovitis only came after the ulcerative colitis, spondylitis often preceded bowel symptoms. In a family study of patients with ulcerative colitis, ankylosing spondylitis and sacroiliitis occurred 12 and 5 times more frequently, respectively, among first-degree relatives than among the general population.[3] Inter-

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estingly, in patients with psoriatic arthritis and their first-degree relatives, there was an increased prevalence of ulcerative colitis.[4] The radiological features of spondylitis are identical to those in patients with idiopathic ankylosing spondylitis.[5]

CROHN'S DISEASE

A similar synovitis was found in 21% of 116 patients with Crohn's disease.[6] One point of contrast was that, whereas surgery abolished the enteropathic synovitis of ulcerative colitis, in Crohn's disease synovitis often came after such intervention. This almost certainly reflects the difficulty in extirpating all the affected bowel in Crohn's disease. Clinical spondylitis occurred in 6.9% and radiological sacroiliitis in 16%. Among first-degree relatives, definite or probably ankylosing spondylitis occurred in 7.4% of men and 10% of women.[7] Mielants and Veys[8] have examined by ileocolonoscopy a series of patients with ankylosing spondylitis. They found inflammatory intestinal lesions in 30%.

DYSENTERY

Reiter's disease (a reactive arthritis) was first described in a German military officer with dysentery. Its features are the same as venereally acquired Reiter's disease. Large joints are predominantly affected, with plantar fasciitis being prominent. In an epidemic of dysentery in Finland, Paronen described 316 patients with Reiter's disease.[9] Ten years later, a follow-up of 100 of these patients showed that only 20 were symptom-free; 32 had ankylosing spondylitis or sacroiliitis.[10]

A classic study from the United States concerned the complement (1276) of the SS Little Rock.[11] Of the crew, 602 contracted dysentery, and 10 developed Reiter's disease. Thirteen years later, four of five who could be traced had persistent symptoms, and these patients were B27-positive. In juvenile Reiter's disease most cases are dysenteric in origin. Of 24 we reported, the male to female ratio was 4.5 to 1, compared with 9 to 1 in adult dysenteric arthritis and 50 to 1 in venereally acquired Reiter's disease.[12]

BEHÇET'S DISEASE

The triad of Behçet's disease is oral ulceration, genital ulceration, and relapsing iritis. In the county of Yorkshire, England, with a population of 5 million, we found 32 cases.[13] The mouth ulcers are deep, painful, and extend over the fauces; they are slow to heal. Arthropathy occurred in 12.3%, mainly affecting the large joints. There is dispute over the prevalence of sacroiliitis. A series of reports from Dilsen[14] have quoted prevalences varying from 87% to 21%, although our own studies of a small number of patients did not demonstrate any increase in the prevalence of sacroiliitis.[15] For that reason the disease is often felt to be more appropriately classified with the vasculitides, but sporadic cases of sacroiliitis and spondylitis continue to be reported.

WHIPPLE'S DISEASE

This comprises malabsorption, arthritis, fever, and lymphadenopathy. The knees and wrists are most frequently involved. Dobbins,[16] from a worldwide survey, found an increased prevalence of HLA B27 in these patients. Of 47 patients tested for B27, 13 (28%) were B27-positive. Twelve of 48 patients had sacroiliitis, and 2 (17%) of these were B27-positive. These data suggest that Whipple's disease may be associated with HLA B27, even in the absence of concomitant sacroiliitis.

SERONEGATIVE SPONDYLARTHRITIS

On the basis of these studies, we postulated the concept of seronegative spondylarthritis.[17] The following criteria were proposed as a basis for including disorders in the spondylarthritides.

1. Negative test for rheumatoid factor.
2. Absence of subcutaneous (rheumatoid) nodules.
3. Peripheral inflammatory arthritis.
4. Radiological sacroiliitis with or without clinical ankylosing spondylitis.
5. Tendency to exhibit clinical interrelationships between individual members of the group. Clinical interrelationship was defined as the coexistence in an individual of two or more of the following: psoriasiform skin or nail lesions; ocular or genitourinary inflammation; buccal, genital, or bowel ulceration; erythema nodosum, pyoderma gangrenosum, and thrombophlebitis.
6. Tendency to familial aggregation (two or more examples of the same disease, or two or more different diseases, in the same family).

This draws together a group of diseases (*Figure*), with ankylosing spondylitis being central. The increased prevalence of HLA B27 among these pa-

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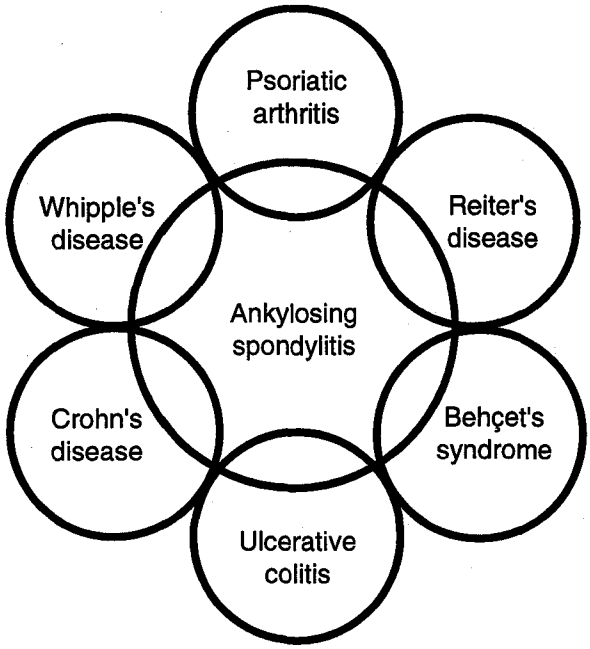

FIGURE. Venn diagram indicating the central position of ankylosing spondylitis in the seronegative spondylarthritis network.

tient groups lends weight to the concept, and indeed in the revised criteria this is included.[18] The European Spondyloarthropathy Study Group developed similar criteria.[19] The criteria scored 87% for sensitivity and for specificity; they were easy to apply and they performed well in all the seven participating centers. One helpful aspect of this study was that the various forms of undifferentiated or unclassified spondylarthritis were included. This has not been a mere academic exercise. It has alerted clinicians to the possibility that backache in patients with inflammatory bowel disease should not be dismissed as an accompaniment of the "gut rot" or as mechanical low back pain. The separation of these diseases from rheumatoid arthritis has important prognostic implications. Moreover, it is important etiologically. A good deal of research has been triggered looking for a possible enteric organism that gains access through the gut or stimulates antibodies implicated in the pathogenesis of ankylosing spondylitis.

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