

A Prospective Study of Sarcoidosis in South East Queensland, Australia (Part 2)

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Abstract

A prospective study of 112 newly diagnosed patients with sarcoidosis was conducted between 1991-1994 at a tertiary cardiothoracic hospital, The Prince Charles Hospital, Brisbane, Australia. Their presenting features were recorded on a specially devised data entry form of 118 fields per patient on dedicated database which was used throughout the study. The population was all white with a bimodal distribution of younger men in their fourth decade and older women. There were more non-smoker than smokers and clinical signs were more common in men. Five percent of patients had a first degree relative with sarcoidosis. Serum angiotensin-converting enzyme was more likely to be elevated in those with stage 1 disease. Histological confirmation was made in 82/112 patients. Hypercalciuria was much more common than hypercalcaemia. A minority of patients developed cardiac, neurological and eye involvement but in some cases this was life-threatening. This is the first prospective multi-disciplinary study of sarcoidosis in Australia. Improved education of physicians about this multisystem condition may lead to better outcomes and more appropriate investigation and treatment for an Australian community.

Key words

Prospective study, sarcoidosis, database, Australian population, presenting data.

Introduction

Sarcoidosis is a multisystem granulomatous disease of unknown aetiology found throughout the world and first characterised by the famous British dermatologist, Hutchison in the late 19th century, initially as a skin condition¹. Its manifestations, severity and prognosis are influenced by a variety of factors including gender, age and ethnic group². Despite very considerable attempts to unlock its secrets both by epidemiological and immunological studies, its true pathogenesis is still elusive. The granuloma, which is the hallmark of chronic inflammation, is more complex than appears at face value, especially what turns the process off. It appears that in sarcoidosis, the “on” switch is stuck in the “on” position and the control of the “off” switch is a complicated matter.

As with most conditions, Australasian clinicians have drawn on clinical data from American studies of sarcoid patients which contain a large proportion of blacks and who in general suffer far more a severer and different form of the disease than whites². Our population, despite an influx of migrants since WW2, is still predominantly white. An overreliance on overseas studies can result in the adoption of inappropriate clinical approach and treatment.

Until recently, little was known about the disease in the Australian population and there have been no systematic investigation of the condition in indigenous Australians. The earliest description of the condition in the Australian literature dates back to 1940 by Lambie who described a case of “Bensier-Boeck’s Disease” in the Medical Journal of Australia³. It would appear uncommon in Australian aborigines and Torres Strait Islanders^{4,5}. The first Australian study published in 1961 by Marshman was an attempt to provide prevalence data in the state of Victoria based on abnormal chest radiographs obtained from compulsory mass survey chest radiographs for tuberculosis surveillance⁶. A prevalence of 9/100,000 was found but this was not based on histological confirmation and he correctly acknowledged that this was in all probability a gross underestimate. Subsequent Scandinavian studies⁷ revealed that chest radiographs are normal in about 50% of patients with sarcoidosis, which is, in any event, not a respiratory disease but one which may affect the chest. Little clinical data was included in

Marshman's study of two pages. The other important study of sarcoidosis in Queensland done thirty years before the current study by Dr Fred Heyworth compliments this data and reveals details on incidence and demographic data obtained by mass survey chest radiography (Part 1). The earlier study also found a bimodal distribution of younger males and older females. Both studies need to be read together to obtain a more complete picture of sarcoidosis in a predominately white Australian population.

Prior to this current study, the author in collaboration has conducted several clinical studies both prospective and retrospective, the latter to fine-tune the database and questionnaire form. These included 52 patients with sarcoidosis to study serum angiotensin-converting enzyme (ACE)⁸, a useful biochemical marker of active sarcoidosis, 51 patients to study the value of bronchoalveolar ACE⁹, and 210 patients studied retrospectively for clinical manifestations, making a total of 313 patients^{10,11}. These earlier studies showed a much lower proportion of neurological and eye involvement than was subsequently found in the in this prospective study. The neurological studies resulted from the prospective study of 123 patients^{12,13}

By way of background to the current study, the author has previously described the use of serum⁸ and lavage ACE^{9,14,15} collaborated on negative studies into the pathogenesis of the disease with DNA probing of tissue for bacteria¹⁶, examined the role of stress proteins¹⁷, described the increased incidence of cryptococcosis in sarcoidosis¹⁸ and the rarity of sarcoidosis in the indigenous Australian⁵, the production of monoclonal antibodies to ACE for potential use in histochemistry¹⁹, the use of an autoradiographic method of studying ACE in sarcoid tissue using ACE inhibitors²⁰ and the assessment of the role of gallium scanning in the management of the condition^{21,22}. A subgroup with cardiac sarcoidosis was also studied²³.

The aim of this current study was to conduct a comprehensive multi-disciplinary study of Australian patients presenting with sarcoidosis to create profile of their demography, symptomatology, and clinical features. This current paper addresses the presenting clinical features only as other papers discuss treatment and certain difficult areas such as neurosarcoidosis. It was realised at the outset that such a study could not provide any meaningful data on incidence and prevalence because of the nature of the disease, and especially because of the "tip on the iceberg" phenomenon. It is probable that no study will achieve this and not even the large ACCESS study currently underway in the USA²⁴. Indeed the author has criticised the ACCESS study for this very reason. However Part 1 of this paper provides useful data on incidence based on the chest radiograph as a diagnostic tool.

METHODS

(i) Database

A specialised data form and computer programme was developed for clinical use following a large retrospective study. The database generated, on request, a summary of the most relevant clinical data on each patient.

(ii) Subjects

By January 1996, there were 161 prospectively studied patients each with 118 fields of data per consultation from June 1991. Data collected retrospectively from medical notes was often found to be unreliable. It also soon became obvious during the study that there were many advantages of managing these patients in a dedicated clinic and this approach led to the first prospective study of neurosarcoidosis in the literature¹³.

Data was analysed on the first one hundred and twelve patients with newly diagnosed or recently re-activated sarcoidosis underwent detailed multi-disciplinary assessments and follow-up by thoracic

physicians, ophthalmologists, neurologists, and cardiologists where indicated. The author often with his registrar saw all subjects personally on presentation, and on follow-up at the sarcoid clinic. A special data sheet pro forma was used at each period of patient contact either at outpatients or in the ward, notated by the clinician and then given to the data manager for data entry.

This study was conducted with the approval of the Prince Charles Hospital Human Ethics Committee and with the patients' formal consent. This was also part of their management.

Patients most commonly resided in Brisbane (53%) and less commonly represented areas were the Gold Coast (7%) and interstate (8%), with one patient from Papua New Guinea. The Prince Charles Hospital was then a cardiothoracic tertiary referral hospital with some other subspecialties and "drained" patients from all over Queensland, some from the Northern Territory and occasionally from the SW Pacific. As the sarcoidosis study became more well publicised some patients were referred to it specifically.

(iv) Statistics

Statistical analysis was performed using Microsoft Excel Version 4.0, on a 486dx OCT personal computer. Tests utilised included student t-tests (non-paired), chi-squared tests, and linear regressions.

RESULTS

Age and Gender

The mean age of men was 38.4 years \pm 12.7, and women 51.4 years \pm 15.3. The most common age of cohort for women presenting with the disease was the seventh decade (14%), and for men the third and fourth decades were equally represented (17%). There were no men over the age of 70, while there were four women (3.6%) in their eighth decade. There was therefore a bimodal distribution of younger males and older females. There was a significant difference between the sexes with respect to age ($p < 0.001$).

In 5% of patients there was a first degree relative with sarcoidosis, the most common relationship being a sibling (4%). Two female patients had husbands with sarcoidosis and one patient had had two husbands who had subsequently developed sarcoidosis (affectionately nicknamed, "Sarcoid Mary").

Smoking

Thirty eight percent of the patients were ex-smokers, mean time since cessation, 11 years having smoked an average of 20 pack years. Only 11% of the patients at presentation were current smokers (8% males, 3% female), with an average 13 pack year history. At presentation, 51% of the patients had never smoked. A smoking history has been shown to be less common in patients with sarcoidosis¹¹.

Symptoms

The most common presenting symptoms were chest pain, lethargy, cough and dyspnoea. Common symptoms are listed in order of frequency (Table I). The chest pain is often a retrosternal dull ache from the mediastinal and hilar lymph nodes or a transient sharp pleuritic pain from a fine salting of granulomata on the pleural surface sometimes seen on open lung biopsy. The lethargy is often very debilitating and sometimes warrants the use of a low dose of oral prednisolone eg 10 mg/day. Sleep apnoea always needs exclusion as another common cause of tiredness. Sicca symptoms i.e. dry eyes or mouth, were particularly common and some patients had sought dental assistance because of increased caries. Artificial tears were often needed and some patients had difficulty with their contact lenses. Less frequent symptoms were arthralgias, both monoarticular, pauciarticular and small joint, night sweats, neurological symptoms, and weight loss. There was no significant sex difference in symptoms profile. Least common symptoms at presentation were dermatological, polyuria, lymphadenopathy and renal colic.

Signs

Signs were much less common at presentation than symptoms and unusual in most cases. The most common presenting signs were a few basal crackles, wheeze and skin lesions (Table II). However, clinical signs on chest examination were infrequent. Skin lesions varied from raised annular lesions similar to ringworm, raised linear pink lesions often in scar tissue and particularly on the knees in women, and fairly non-descript papules sometimes on the face or arms. Some patients had disfiguring cutaneous lesions on the face and lupus pernio was also seen during the study. Subcutaneous nodules were also found, often on the forearms or legs and were best detected by running the palm of the hand across the skin. There were a number of less common signs observed in patients including lymphadenopathy, erythema nodosum, neurological, heart failure and cardiac enlargement, splenomegaly, hepatomegaly, and irregular pulse. In general there were fewer signs observed across the population, in comparison to the incidence of symptoms. Men had a higher incidence of clinical signs than women. The neurological features have already been described¹³.

Investigations

(i) Chest Radiograph

Chest radiograph (CXR) was classified as follows: normal – stage 0, bilateral or unilateral hilar enlargement – stage I, bilateral or unilateral hilar enlargement with pulmonary infiltrates – stage II, and pulmonary infiltrates only – stage III. Eight percent of patients presented with normal chest radiographs (CXR), 34% had stage I sarcoidosis, 22% had stage II and 16% of patients had stage III disease (Figure 1). Massive hilar nodes called “potato” lymph nodes were frequently seen on presentation. A chest radiograph showing a pacemaker in the left upper chest with either a pulmonary infiltrate and or hilar enlargement became an increasingly common radiographic clue. In some patients with stage 2 or 3 disease the pulmonary infiltrate was sometimes patchy, quite focal and often asymmetric. The hilar adenopathy was sometimes unilateral and at times resolved in an asymmetric fashion.

The high resolution CT scans with 1mm slices were classified in the same way as CXR with a total of 52/112 patients done on at presentation, 21% of whom had stage I disease, 15% of patients had stage II, and 4% stage III disease only. Normal chest CT scans were found in 5% of those scanned. Scans were assessed qualitatively and reported by an independent observer, a radiologist. A few patients presented with an acute onset, febrile, hypoxemia and with a ground glass pulmonary infiltrates. Several patients had isolated focal pulmonary infiltrates that were not visible on chest radiograph, and at least one of whom turned out to have cardiac sarcoidosis requiring a pacemaker.

(ii) Gallium-67 Scan

Gallium-67 scan was performed on 24 patients at presentation for specific indications. Pulmonary and mediastinal uptake was increased in 92% of patients scanned, with less commonly affected areas being parotid glands (13%), eyes (13%), and spleen (13%). Salivary gland uptake was increased in 9% of patients scanned. The typical panda-lambda appearance of sarcoid involvement of parotids and hilar nodes was a very useful diagnostic sign seen in some patients^{21,22}.

(iii) Histological Investigations

Histological confirmation was obtained in 82/112 patients. Some patients had classical features of sarcoidosis obviating the need for tissue confirmation eg. young women with erythema nodosum and hilar lymphadenopathy (Lofgren’s syndrome) although these were in the minority. The most common methods were mediastinoscopy (40%), transbronchial biopsy (24%), open lung biopsy (12%), skin biopsy (6%), and Kveim biopsy (1 subject, and performed overseas as Kveim antigen was not available in Australia then). Other biopsies included nerve, muscle, cardiac and other lymph nodes (Table III). Of those without histological confirmation the diagnosis was made on the basis of symptoms, signs, radiological investigations and classical features of the disease. Transbronchial biopsies were positive in

about 60% of patients even in the absence of pulmonary infiltrates (eg in stage 1 disease) but this depended also on the skill of the operator. The yield was so low in patients with stage 0 disease that it was usually not attempted. The yield was higher in stages 2 and 3.

(iv) Biochemical Investigations

(a) Serum Angiotensin Converting Enzyme (serum ACE)

Serum ACE was performed before commencement of treatment in 87/112 patients. Of these patients, 36% had abnormally elevated serum ACE (23% male, 13% female). As previously reported there was no significant sex difference with respect to serum ACE elevation⁸. Surprisingly, the age group who mostly commonly had an elevated serum ACE was the seventh decade (n=9), while the next most common cohort was the fourth decade (n=7). The CXR stage in patients where serum ACE was more likely to be elevated was in Stages I (14%) and II (11%) in males in contrast to females – Stage I (6%), Stage II (1%), Stage III (4%). A total of 96 patients had serum ACE tested throughout the entire study, with 48% having elevated serum ACE (65:35 male: female). Only two out of four patients with hypercalcaemia had simultaneous elevated serum ACE, contrary to our previous findings⁸. A normal serum ACE at presentation therefore could not be relied upon to exclude sarcoidosis either active or inactive. The reason for not performing serum ACE measurements on all patients was partially due to the common use of ACE-inhibitors for hypertension.

(b) Serum Calcium

Hypercalcaemia (>2.55 mmol/L albumin normalised) was seen in 4/85 patients at presentation. During the study, of 97 patients tested, only 6% had hypercalcaemia at some stage. Corticosteroids were not uniformly used to treat this as sometimes it was only mild.

(c) 24 Hour Urinary Calcium

Hypercalciuria (24 hour urine calcium (corrected) > 7.5 mm/24hrs) was found in 35/83 patients (males = 20, females = 15) tested at presentation. Hypercalciuria was more common in males than in females (60: 40). There were 9/15 women who were aged greater than 55 at presentation. Of the hypercalciuric patients, 33% of the women and 40% of the males also had concurrently elevated concentrations of serum ACE. A 24 hour urinary calcium was regarded as a mandatory test for patients at presentation by the end of the study.

(v) Respiratory Function Tests

At first assessment 95/112 patients had routine lung function tests (RFT's) performed – (56% male and 44% female). Of the group tested 10% of males showed both reduced FEV₁ and VC (less than 80% of predicted values) at presentation. Seven percent of the men had both low FEV₁ and VC. Of those women tested, 17% had abnormally low FEV₁ and VC.

Carbon monoxide uptake (Kco) was reduced (<80% to 75%) at presentation in 4.5% of males (n=5), and 6.3% of females (n=7). Of the women in this group, none currently smoked and one was an ex-smoker. There were two male ex-smokers.

Comparisons were made between those that had smoked previously, or currently smoked, and those who had never smoked with respect to the three variables – FEV₁, VC, KCO. Comparisons were also made between the respiratory parameters at the initial and most recent assessments. This excluded any patient that had only visited the clinic once, or had not had the RFTs performed more than once.

(a) Effect of Smoking on Lung Function – Forced Expiratory Volume in One Second (FEV₁).

Of the 112 patients in the study, 35 males and 37 females had never smoked, while 18 males and 10 females were ex-smokers. At the time of presentation, 9 males and 3 females were currently smokers. Ex-smokers had smoked for an average of 20 pack years, and had ceased 11 years before presentation. The current smokers had smoked for an average 13 pack years.

The mean forced expiratory volume in one seconds (FEV₁) for the 38 patients who were current or ex-smokers was surprisingly higher (3.31 ± 0.96 , median 3.34, n = 38) at presentation, than in the 72 patients who had never smoked (2.98 ± 1.26 , median n = 60), (p = 0.04, F- test).

(b) Effect of Smoking on Lung Function - Vital Capacity (VC)

The mean VC for smokers and ex-smokers was again higher (4.15 ± 1.19 , n = 37), than in non-smokers (3.79 ± 1.54 , n = 60), (p=0.05, F-test).

(c) Effect of Smoking on Lung Function - Diffusion constant (Kco)

The mean Kco (ml/min/mmHg/1) for smokers and ex-smokers was not significantly different (5.00 ± 1.16 , n = 34) from that of non-smokers (5.21 ± 1.06 , n = 54), (p=0.27, F – test).

(vi) Treatment at Outset

Of the total group, 10 males and 11 females required treatment with oral prednisolone from their initial presentation. One woman was given intravenous methyl prednisolone for papilloedema due to neurosarcoidosis. A majority of patients were observed throughout their illness and did not need treatment. Severe pulmonary involvement, cardiac sarcoidosis, and hypercalcaemia were most one of the more common indications. However in some patients with hypercalcaemia and hypercalciuria were treated with increased fluid intake, avoidance of dairy products, excessive sunlight and vitamin D containing foods. During the study patients were treated with hydroxychloroquine (200 mg/day or bd), methotrexate (the drug of choice for skin lesions) 7.5 mg/week up to 15 mg/week with folate 0.5mg/day, and occasionally azathioprine was used in more intractable cases. These drugs were often used in combinations and with oral corticosteroids. It was unusual for the oral prednisolone dose to be more than 50mg/day and for some patients with very severe lethargy a dose of between 10-25 mg/day usually was usually sufficient.

(vii) Cardiac Involvement

Seventeen women (34% of all women included in the study) and 13 men (21% of total males) had cardiac assessments by cardiologists at the Prince Charles Hospital at presentation. Within this group of people tested at presentation 4 out of 16 electrocardiograms (ECG's), and 9 out of 14 echocardiograms performed were abnormal. Two young (4th decade) male patients presented with complete heart block, one of whom proceeded to a successful orthotopic cardiac transplant. Although most of the patients had a detailed cardiac assessment through the study, the yield in finding previously unsuspected cardiac sarcoidosis was very low. However, the incidence of cardiac sarcoidosis amongst the patients canvassed in the study was higher than that reported in other studies. The finding of minor pulmonary involvement or bilateral hilar lymphadenopathy alone did preclude cardiac sarcoidosis. The one patient who required cardiac transplantation was only in retrospect found to have cardiac sarcoidosis after the transplantation and the only manifestation being subtle hilar lymphadenopathy. The severity of organ involvement was often erratic and unpredictable. Severe disease in one organ did not mean all organs were similarly affected. One young woman subsequently died suddenly presumably from a ventricular arrhythmia. A further study of cardiac sarcoidosis has already been reported²³. While gated cardiac MRI was used in some cases, the quality of images in the early 1990's was inferior to that of more modern MRI's. Cardiac and whole body PET scanning is showing even more promise and is a currently being investigated by the author.

(viii) Eye Involvement

At presentation, 10 women, and 6 men (14% of the total) were formally assessed by an ophthalmologist for eye involvement. Five of these 16 had abnormal tear flow, indicated by abnormal Schirmer's and Rose Bengal tests, 2 had abnormal conjunctiva (keratopathy), one woman had bilateral anterior vasculitis, and one woman had bilateral vitritis. The lens was not affected by sarcoid. Two patients had papilloedema on presentation. Uveoparotid fever (Heerfordt's syndrome) was seen during the study and eye examination in patients with parotid enlargement is recommended to exclude this. By the end of the study formal eye assessment was routine. Subsequent to this study all patients seen by the author are referred to an ophthalmologist with a special interest in uveitis and sarcoid eye disease on presentation especially as eye involvement is often asymptomatic and blindness can result. In patients taking corticosteroids or hydroxychloroquine a regular eye review is even more important.

(ix) Neurological Involvement

All patients had a comprehensive neurological examination on initial presentation. A proportion had a detailed CNS examination and nerve conduction studies by a neurologist. Neurological symptoms were reported by eight males, and nine females – at total of 13% of patients – at presentation, and clinical signs were observed in seven patients (6%). Nerve conduction studies were carried out on six patients at presentation (5%). Only two of these proved to be abnormal. Further investigations were carried out on some of these patients at later dates, including CT and MRI brain. The results of neurological abnormalities are shown in Table IV and more detail has already been published¹³.

DISCUSSION

In the conducting of such studies with enormous amount of information, it is always tempting to put off the day that the data analysis is finally done for publication as more and more patients enter the study and which in turn changes the data. As applies in all aspects of scientific research the observer and process of observation affects the very observations. The study itself changes the practice of the consultants which then may render the data in the earlier part of the study misleading. For example the histological confirmation of the disease by mediastinoscopy is usually unnecessary and can be replaced by transbronchial lung biopsy or on occasions of skin involvement, a simple skin biopsy. However this involves changing the habits of surgeons and some physicians as well as the referral patterns of general practitioners. The Kveim test has not been available in this country for about four decades.

By January 1996, there were 161 prospectively studied patients each with 118 fields of data per consultation from June 1991. It should be noted that the data of 112 patients are presented. The author has also found from experience with several retrospective studies of sarcoidosis that deficiencies occur which can only be corrected by prospective studies. From the experience of the initial retrospective studies, it was found that data collected retrospectively from medical notes is notoriously unreliable, sometimes misleading and there is sometimes a temptation to want to fill in the gaps by scientific poetic licence. For example a mention of "sore eyes" in a chart may be interpreted as sarcoid eye involvement rather than just dry eyes or even allergic conjunctivitis. Some symptoms of sarcoidosis are completely overlooked and not even in the literature eg painful balls of the feet. This study also led to the first and only prospective study of neurosarcoidosis and another study into cardiac sarcoidosis is in progress.

The need for an initial followed by an annual consultation by an ophthalmologist became increasingly apparent and even then ideally by an ophthalmologist with a special interest in this area. This is the case at the author's current institution. It became apparent that a thorough neurological examination was needed on all patients on presentation and periodically on review. All the patients with neurological symptoms or signs were referred to the same neurologist as well as the author and in the process there evolved a growing "feel" for neurosarcoidosis. With experience, the more subtle patterns inherent in the

disease started to evolve emerge including one case of spinal cord involvement and several cases mimicking multiple sclerosis.

The by-product of this study was a large data base, a sarcoidosis (and also interstitial lung disease) proforma to be used with each consultation, a dedicated sarcoidosis and interstitial lung disease outpatient clinic (the first in this country), a tissue bank of frozen tissue in liquid nitrogen for study, a dedicated data manager and the use of the database by two overseas groups²⁵. The frozen tissue was later used for investigations into the possible causation of sarcoidosis by bacteria.

The stable incidence of sarcoidosis outlined in Part 1 of this paper, as well as a recent British study suggests that the initiating event in the onset of this disease is not influenced by changes in population, the incidence of tuberculosis or environmental factors²⁶. This adds some weight to the author's hypothesis that there is an internal antigenic stimulus possibly from an antigen from the gut. As liver involvement is almost universal but overlooked because of the difficulty in doing a liver biopsies, and the spleen commonly involved, it is possible that a common bacterial antigen such from the bowel sets off a cascade of events in susceptible subjects that produces granulomata all over the body. The gut is one of the few places that is unaffected by sarcoidosis although enlarged abdominal lymph nodes are commonly present but less frequently sought. A detailed discussion of theories on the pathogenesis of sarcoidosis is beyond the scope of this paper.

Over the past 25 years there have been various "fashionable" approaches to this disease including the need to do broncho-alveolar lavage and gallium-67 scanning on everyone presenting with sarcoidosis. Despite dubious statistical evidence of their routine place in sarcoidosis, these costly tests were widely adopted here and overseas for many years. As the disease has different manifestations and degrees of severity in different countries and racial groups, it is important to develop some "home spun" experience with this condition for the establishment of the most cost-effective investigations and treatments in a local setting.

Over the past thirty years, there was been no dramatic change in the treatment of this condition although some newer very costly drugs like Infliximab have shown some promise in a minority of patients. These consist of corticosteroids, hydroxychloroquine, methotrexate, sometime azathioprine and more importantly, what the author calls "chronotherapy" or intelligent observation in the hope that treatment will not be needed. Few die from it here but the effect on quality of life is quite considerable. There is a significant subset of patients, often young, who develop life-threatening cardiac involvement and require expensive treatment including defibrillating pacemakers and even heart transplantation. There is another subgroup that develops inexorable fibrotic lung disease sometimes leading to cavities, some with aspergillomata and a need for lung transplantation. Neurosarcoid and ophthalmic involvement may be equally devastating and difficult to treat.

It is hope that this current study may dispel some myths (eg that erythema nodosum is a common presenting feature) and provides some useful information for the busy Australasian clinician. It describes only the beginning and not the whole picture. Until the pathogenesis of this condition is better understood it is unlikely any great advances in treatment will occur. It is the author's opinion that what is needed at present is not another Australian sarcoid data base which is extremely time-consuming and costly to run and often ends up as a "stamp collecting exercise", but better education of the medical community including surgeons for a more cost-effective and efficient means of managing patients with this condition who are often in their prime of life. More patient education and support groups are also needed.

Acknowledgements

Table I – Frequency of presenting symptoms in patients with sarcoidosis

<i>Most common presenting symptoms</i>		
Symptom	Number	Percentage
Chest pain	51	46%
Lethargy	48	43%
Cough	35	31%
Sicca Symptoms (dry eyes or mouth)	33	30%
<i>Less common symptoms</i>		
Symptom	Number	Percentage
Arthralgias	24	21%
Dyspnoea	21	19%
Neurological	17	15%
Nightsweats	17	15%
Weight loss	16	13%
<i>Least common symptoms</i>		
Symptom	Number	Percentage
Wheeze	14	13%
Eyes (other)	13	12%
Fever	9	8%
Thirst	8	7%
Skin	7	6%
Polyuria	7	6%
Renal colic/stones	3	2%
Lymphadenopathy	3	2%

Data obtained from 1991 to 1994. n =112.

Table II – Presenting signs in patients with sarcoidosis (1991-1994), n=112

<i>Most common presenting signs</i>		
Signs	Number	Percentage
Crackles	16	14%
Neurological	16	14%
Wheeze	10	9%
Skin	7	6%
<i>Less common signs</i>		
Signs	Number	Percentage
Lymphadenopathy	4	3%
Erythema nodosum	4	3%
Joints	4	3%
<i>Least common signs</i>		
Signs	Number	Percentage
Cardiac enlargement	2	1%
Cardiac failure	2	1%
Irregular pulse	2	1%
Hepatomegaly	1	<1%
Splenomegaly	1	<1%

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