Justyna Fijołek[1], Elżbieta Wiatr[1], Dariusz Gawryluk[1], Renata Langfort[2], Jarosław Kober[3], Dorota Piotrowska-Kownacka[4], and Karina Oniszh[5]

[1]Third Department of Lung Diseases, Institute of Tuberculosis and Lung Diseases, Warsaw, Poland
Head of the Department: Prof. K. Roszkowski-Śliż, MD, PhD
[2]Department of Pathology, Institute of Tuberculosis and Lung Diseases, Warsaw, Poland
Head of the Department: R. Langfort, MD, PhD
[3]Department of the Internal Diseases of the Chest, Institute of Tuberculosis and Lung Diseases, Warsaw, Poland
Head of the Department: Prof. A. Torbicki, MD, PhD
[4]Second Department of Clinical Radiology, Independent Public Central Teaching Hospital, Medical University of Warsaw, Warsaw, Poland
Head of the Department: Prof. O. Rowiński, MD, PhD
[5]Department of Radiology, Institute of Tuberculosis and Lung Diseases, Warsaw, Poland
Head of the Department: I. Bestry, MD, PhD

The principles of diagnosis of Churg-Strauss syndrome, in the authors' experience

Podstawy rozpoznania zespołu Churga-Strauss w materiale własnym

Abstract

Background: The diagnosis of Churg-Strauss syndrome (CSS) poses considerable diagnostic difficulties as the histological confirmation of eosinophilic necrotising vasculitis is obtained in a small number of patients with advanced disease. It therefore seems that CSS may be suspected in patients with asthma and peripheral blood eosinophilia, and the diagnosis is confirmed by the occurrence of defined clinical manifestations of histologically confirmed or unconfirmed vasculitis. The aim of the paper was to outline the principles of diagnosis of CSS in the authors' material.

Material and methods: We analysed 38 patients. The assessments performed in each patient included complete and differential blood counts, blood biochemistry, urinalysis, chest and paranasal sinus radiographic imaging, and echocardiography. Twenty-two out of 23 patients presenting with cardiac manifestations underwent cardiac magnetic resonance imaging (MRI). Two patients underwent mediastinoscopy and four underwent laparotomy.

Results: Only in 13 out of 38 patients was the diagnosis of CSS was confirmed histologically, and in the remaining patients the diagnosis was based on clinical manifestations. In 23 patients, the diagnosis was based on cardiac manifestations associated with the involvement of the myocardium by inflammation, which was documented by MRI. In 9 cases, the diagnostic evaluation was prompted by cutaneous changes. Six patients presented with gastrointestinal complaints, 15 patients suffered from peroneal nerve palsy, and one from polyneuropathy and central nervous system symptoms.

Conclusions: The diagnosis of CCS in our material was mainly based on clinical manifestations. The collection of material for histopathology was difficult and required an invasive approach in most cases. In 13 out of 38 patients eosinophilic vasculitis was confirmed histologically. The development of marked peripheral blood eosinophilia in an asthmatic patient with a history of allergy, sinusitis, and pulmonary infiltrates in the presence of specific organ manifestations was most consistent with CSS. Indirect proof came in the form of the meeting of the classification criteria developed by the American College of Rheumatology, which differentiated CSS from other vasculitides.

Key words: Churg-Strauss syndrome, clinical manifestations, principles of diagnosis.

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Adres do korespondencji: Justyna Fijolek, MD, PhD, Third Department of Lung Diseases, Institute of Tuberculosis and Lung Diseases, Płocka St. 26, 01–138 Warsaw, Poland; tel.: +48 22 431 23 80; fax +48 22 431 24 08; e-mail: jfijolek@op.pl

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Introduction

According to the definition adopted in 1994, Churg-Strauss syndrome (CSS) is characterised by: (1) eosinophil-rich and granulomatous inflammation involving the respiratory tract and (2) necrotising vasculitis affecting small to medium-sized vessels and associated with (3) asthma and (4) blood eosinophilia [1].

CSS has been described in those patients with periarteritis nodosa, whose distinguishing feature was the co-existence of allergic manifestations, including asthma, eosinophilia, and pulmonary infiltrates with upper respiratory symptoms [2]. In 1951 Churg and Strauss defined the pathological findings identified in 13 patients (including 11 autopsies) with the above clinical features as: (1) necrotising vasculitis, (2) eosinophilic tissue infiltrates, and (3) extravascular granulomas, which have since become the diagnostic criteria of this syndrome [3].

CSS is a rare disease, and, due to the compliance with the strict pathological criteria, the syndrome is probably even less frequently detected. The incidence is currently estimated at 0.5–6.8 per 1,000,000 per year and the prevalence at 10.7–14.0 per 1,000,000 [4, 5]. Confirmation of all the three components of the pathological diagnosis (which are usually not present concurrently) is very difficult, particularly in living patients. Furthermore, the triad described by Churg and Strauss is not pathognomonic for CSS and may be seen in other eosinophilia-associated diseases [2]. Therefore, for a long time now, attempts have been made to define diagnostic criteria that would be less orthodox in terms of pathology, with a more precise definition of clinical manifestations characteristic of the syndrome [2, 6–8]. Lanham et al. observed 16 of his patients and carried out a meta analysis of 138 patients managed at other facilities and described a multiphasic course of the disease: phase I, or the prodromal phase, was characterised by manifestations of allergy (asthma, allergic rhinitis) and could last for several years; phase II — the peripheral blood and tissue eosinophilia with manifestations of Loffler's syndrome chronic eosinophilic pneumonia or eosinophilic gastroenteritis; and phase III — the vasculitis phase [2]. The most common manifestations of CSS are respiratory manifestations (asthma and pulmonary infiltrates), which may be present in phases II and III. The only feature distinguishing between these two phases is the result of histopathological evaluation and the presence of the signs of vasculitis in phase III in addition to eosinophilic infiltrates. Similarly, respiratory manifestations may result from both eosinophilic infiltrations and vasculitis. Manifestations of cardiac, cutaneous, nervous system, and renal involvement, on the other hand, are associated with eosinophilic vasculitis and are generally present only in CSS, constituting a characteristic component of this syndrome [2]. Based on their own material, Guillevin et al. [7] and Della Rosa et al. [8] proposed certain symptom patterns within these organs. After ruling out such causes as infections, metabolic disorders, and valvular heart disease, they considered the following manifestations characteristic of CSS: acute pericarditis, constrictive pericarditis, heart failure, myocardial infarction, and cardiomyopathy. The most common cutaneous manifestations included tender subcutaneous nodules, mainly on the skin of the head, and purpura, urticaria, macular or nodular rash and—less frequently—livedo reticularis, nodule ulcerations, or infarcts in the cutaneous vessels. Within the nervous system, characteristic mononeuritis multiplex, most commonly with the involvement of the peroneal nerve, was observed. Inflammation of the cranial nerves II, III, VII, and VIII with the optic nerve being the most commonly involved, in the form of nerve ischaemia. Within the central nervous system (CNS) coma, psychoses, confusion and convulsions were observed. The CNS involvement is the most common cause of death, whose mechanism most probably involves brain haemorrhage or cerebral vessel emboli [2]. Segmental glomerulonephritis with signs of necrosis, including crescents in some cases, is a characteristic feature of renal involvement. Although these features may also be present in granulomatosis with polyangiitis (formerly: Wegener's granulomatosis) or polyarteritis nodosa, CSS may be distinguished from the other vasculitides using the classification criteria proposed by the American College of Rheumatology (ACR). This purpose is served by the following features: (1) asthma, (2) eosinophilia exceeding 10%, (3) mono- or polyneuropathy, (4) non-fixed pulmonary infiltrates, (5) paranasal sinusitis, and (6) extravascular eosinophilic infiltrates on biopsy. The presence of at least four of these six criteria yields a sensitivity of 75% for the classification of vasculitis as CSS [9]. In addition, the renal abnormalities in CSS are much more susceptible to treatment with glucocorticosteroids. Renal failure is rare and responds to combination treatment with glucocorticosteroids and immunosuppressants [2, 7, 8].

The aim of the paper was to outline the principles of diagnosis of CSS in our own material based on pathological criteria or recognised clinical

manifestations in cases where no material for histopathological evaluation was available.

Material and methods

Our material consisted of 38 patients (16 men and 22 women) hospitalised at the Third Department of Lung Diseases, Institute of Tuberculosis and Lung Diseases, Warsaw, Poland, between 1990 and 2010, in whom the diagnostic evaluation for CSS was undertaken due to persistent peripheral blood eosinophilia exceeding 10% (i.e. exceeding 1500/mm^3) and in whom larva migrans syndrome and drug reactions were ruled out by enzyme-linked immunosorbent assay (ELISA) and history, respectively. All the patients underwent a high-resolution computed tomography (HRCT) scan of the chest. Patients in whom pulmonary infiltrates were revealed on chest HRCT underwent bronchoscopy with bronchial washing for the presence of eosinophils and transbronchial lung biopsy. Sputum was examined for the presence of eosinophils in all the patients. All the patients underwent reversibility spirometry, a paranasal sinus CT scan, and an ENT examination. Nineteen patients underwent an organ biopsy (the biopsy was not performed in patients in grave clinical condition or in patients on glucocorticosteroids). In patients in whom tissue samples or histopathology results were not available, observations made by Lanham and Guillevin on the clinical manifestations that may be attributed to CSS after other aetiologies have been ruled out (Table 1) [2, 7]. Patients with cardiac manifestations underwent a 24-hour ambulatory ECG monitoring, echocardiography, and cardiac magnetic resonance imaging (MRI) at a specialist facility (for the past three years these investigations have been performed in all patients with hypereosinophilia irrespective of the clinical and electrocardiographic manifestations). Patients with cutaneous lesions were consulted by a dermatologist, and patients with nervous system manifestations were consulted by a neurologist.

Results

Twenty-nine patients (76%) gave a history of symptoms suggestive of allergy and 34 (89.5%) were being treated for asthma that started between 15 and 56 years of age and posed therapeutic problems in one patient only (who is now being successfully treated with methotrexate). All the patients had considerably elevated relative eosinophil counts (25–75% [mean: 40%], i.e. 3,000–50,000/mm^3). Twenty-eight patients (73.7%) had signs and symptoms of chronic paranasal sinusitis and/or nasal polyps. Lung changes on HRCT were revealed in 36 patients (94.7%), with rapidly migrating ground-glass opacities being the most common ones (Figure 1 A–C). Among these patients, the diagnosis was established on the basis of transbronchial lung biopsy in 3 patients and on the basis of bronchial wall biopsy in a further 3 cases. In addition to the parenchymal changes, pleural effusion with eosinophilia exceeding 25% (7 patients) and mild hilar and mediastinal lymphadenopathy (6 patients) were also observed. Chest X-rays revealed an enlarged cardiac silhouette (10 patients).

The diagnosis of CSS was established in different clinical settings. In some patients, asthma and eosinophilia (?1500/mm^3) triggered the deliberate diagnostic investigation of the underlying causes of these abnormalities. In other patients, the fulminant organ-specific manifestations suggested a systemic disorder, which required confirmation by specialist investigations. Twenty-three patients presented with the following cardiovascular manifestations considered to be organ-specific manifestations of CSS (Table 2): severe heart failure with a left ventricular ejection fraction of about 20% (Cases 7, 11, 21, 22, 24, 27, and 28) and abnormalities of cardiac rhythm and conduction (Case 3). Two patients required resuscitation for cardiac arrest (Cases 6 and 12) and one suffered myocardial infarction (Case 13). One patient developed cardiogenic shock (Case 15) during a three-day hospitalisation for changes in lung parenchyma of suspected inflammatory origin (Figure 2 A–C). In 9 patients (cases 5, 9, 14, 16, 23, 27, 29, 37, and 38), significant changes characteristic of active myocarditis were detected by MRI although the patients did not experience any pain, while in 2 other patients the diagnosis of myocarditis was established on the basis of an MRI scan performed for pain (Cases 1 and 33).

In 9 patients (23.6%) treated for asthma in whom hypereosinophilia was detected, developed cutaneous changes (blisters, haemorrhagic and nodular changes) were confirmed to be associated with vasculitis by histology in 3 cases. Only in 2 cases was this the only extrapulmonary organ affected, while in the remaining patients the cutaneous changes were accompanied by other organ-specific manifestations.

Six patients admitted to our Department for marked eosinophilia accompanied by asthma gave a history of gastrointestinal complaints (abdominal pain, bloody diarrhoea, vomiting). Four of them underwent laparotomy with resections of various

Table1. Clinical criteria of organ involvement in Churg-Strauss syndrome in own material according to Lanham and Gillevin suggestions [2, 7]

Organ	Clinical criterium
Heart	Cardiac insufficiency, arrhythmias, pericarditis, cardiac defect, myocarditis, cardiac infarction, cardiac arrest
Neurological	Mononeuritis multiplex, peripheral neuropathy, stroke, paralysis of cranial nerves
Skin	Purpura, nodules, hemorrhagic, vesical lesions
Gastrointestinal	Abdominal pain, bloody diarrhea, nausea, perforation, occlusion, peritonitis, cholecystitis, pancreatitis
Kidney	Proteinuria >1 g/d., haematuria, rise of creatinine

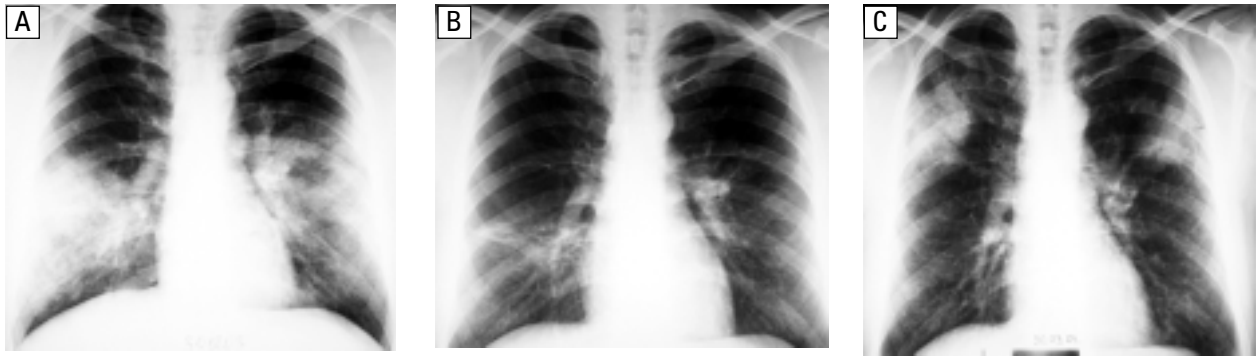

Figure 1 A–C. Chest X-rays — migratory eosinophilic pulmonary infiltrates in Churg-Strauss syndrome patient (tab. 2, patient 8)

segments of the gastrointestinal tract (resection of a segment of the large bowel, gastrectomy, cholecystectomy) in which the verification of tissue specimen revealed eosinophilic infiltrates and signs of vasculitis (Case 2, Figure 3). One patient (Case 13) treated for asthma and nasal polyps developed manifestations of acute pancreatitis (which, unfortunately, could not be confirmed histologically), which subsided following high-dose glucocorticosteroid treatment.

Neurological manifestations were present in 16 patients, including one patient who also had CNS manifestations in the form of convulsions and hemiparesis. In the remaining cases, the most common neurological manifestation was peroneal nerve palsy (Table 2).

Overall, the diagnosis of CSS based on histological findings (signs of vasculitis) was established in 13 out of 38 patients (34.2%) (Table 3).

Discussion

In our material, we analysed the cases of 38 patients. Histopathological confirmation of vasculitis could be obtained in 13 patients. In the remaining patients, the diagnosis was primarily based on the clinical presentation. The prevalence of organ-specific manifestations reported by other authors [6–8, 10] is largely comparable with our findings (Table 4).

Asthma is the most common component and the cardinal manifestation of CSS. Its prevalence in this group of patients is estimated at 96–100% and it may precede vasculitis by as much as 30 years (3–9 years on average). Asthma is often accompanied by allergic rhinitis, nasal polyps, and chronic recurrent paranasal sinusitis [11]. In our material, asthma was present in 34 out of 38 patients (89.5%) with only 4 patients not reporting any symptoms of this disease. Asthma is, however, known to develop later in the course of CSS, even several years after the onset of vasculitis [11]. There are reports that asthma in patients with CSS is difficult to treat. Our patients responded well to inhaled glucocorticosteroids and only periodically required treatment with systemic glucocorticosteroids at the dose equivalent to 10–15 mg of prednisone. Only in one case, vertebral fractures were observed as a result of long-term systemic glucocorticosteroid treatment (for severe persistent asthma), and that patient was successfully switched to methotrexate (Case 9).

The prevalence of pulmonary changes in patients with CSS is estimated at 37–77%. Choi et al. described 9 patients with the following changes on chest radiograms: lymphadenopathy, bilateral pa-

Table 2. Clinical characteristic of Churg-Strauss syndrome in own material

Sex/Age	Asthma Allergy	Eosinophilia >10%	Sinusitis and polypus	Lung involvement	Peripheral and central nervous system involvement	Skin gastro-intestinal involvement	Heart involvement	Kidney involvement	Criteria ACR
1. M/40 B.J.	+/+	+	+	+	+	–/–	+	–	5/6
2. K/31 B.K.	+/+	+	–	+	+	–/+	–	–	5/6
3. K/50 B–S.J	–/+	+	+	+	–	–/–	+	–	3/6
4. K/37 B.I.	+/+	+	+	+	+	+/–	–	–	5/6
5. K/15 D.V.	+/+	+	+	+	+	–/+	+	–	5/6
6. M/42 D.A.	+/+	+	+	+	–	–/–	+	–	4/6
7. K/41 J.M.	+/–	+	–	+	–	–/–	+	–	3/6
8. M/29 J.M.	+/–	+	+	+	–	–/–	–	–	5/6
9. M/23 J.M.	+/+	+	+	+	+	–/–	+	–	5/6
10. M/22 K.P.	+/+	+	+	+	+	–/–	–	–	5/6
11. M/42 K.R.	+/+	+	–	+	+	+/–	+	–	4/6
12. K/20 M.V.	+/+	+	+	+	–	–/–	+	–	4/6
13. K/35 M.O.	+/+	+	+	+	+/+	+/–	+	–	5/6
14. M/41 P.G.	+/–	+	+	+	–	–/–	+	–	4/6
15. K/35 P.A.	+/–	+	+	+	–	–/–	+	–	4/6
16. K/38 P.A.	+/–	+	+	+	–	–/–	+	–	5/6
17. K/31 R.M.	+/–	+	+	+	–	+/–	–	–	5/6
18. M/40 S.T.	+/+	+	–	+	+	–/–	–	–	5/6
19. K/56 S.E.	+/+	+	–	–	–	–/+	–	–	3/6
20. M/34 S.P.	+/+	+	+	+	+	–/+	+	–	5/6
21. K/31 T.M.	+/+	+	+	+	–	–/–	+	–	4/6
22. M/20 T.M.	+/+	+	–	+	–	–/–	+	–	3/6
23. M/26 K.Ł.	+/+	+	+	+	–	+/–	+	–	5/6
24. M/26G.R.	+/+	+	+	+	+	–/–	+	–	5/6
25. K/63 M.M.	+/+	+	+	+	–	–/+	–	–	5/6
26. M/57 P.Z.	+/+	+	–	+	+	–/–	–	–	4/6
27. M/58 S.A.	+/–	+	–	+	–	–/–	+	+	3/6
28. K/58 M.Ł.	+/+	+	+	+	–	–/–	+	–	4/6
29. K/30 W.A.	+/–	+	+	+	+	–/–	+	–	5/6
30. K/60 N.M.	+/+	+	+	+	–	–/–	–	–	5/6
31. M/57 U.A.	–/+	+	–	+	+	–/–	–	–	4/6
32. M/42 B.I.	–/+	+	+	–	+	+/–	–	+	3/6
33. K/56 O.U.	+/+	+	–	+	+	+/–	+	–	4/6
34. K/23 G.B	+/+	+	+	+	–	+/+	–	–	5/6
35. K/41 R.B.	+/+	+	+	+	–	–/–	–	–	4/6
36 K/74 S.A.	+/+	+	+	+	–	+/–	–	–	4/6
37. K/52 A.E.	+/+	+	+	+	–	–/–	+	–	4/6
38. K/23 M.K.	–/–	+	+	+	–	–/–	+	–	3/6
Overall	34/29	38	28	36	16/1	9/6	23	2	

ACR — American College of Rheumatology

renchymal consolidation, nodules, pleural effusion, pleural thickening, and pericardial effusion [12]. Abnormal findings on chest X-ray were present in 36 out of 38 of our patients (94.7%), with the most common abnormalities being ground-glass opacities and fine nodular shadows, but also mediastinal lymphadenopathy, pleural effusion, and bronchial wall thickening. In none of the pa-

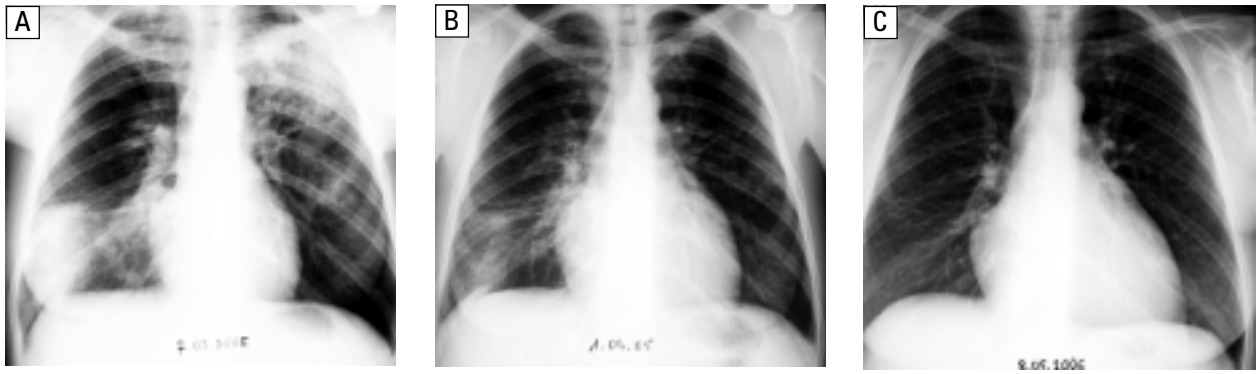

Figure 2 A–C. The sequence of chest X-rays in Churg-Strauss syndrome patient with the heart involvement. **A** — (7.03.2005) massive pulmonary infiltrates — suspicion of pneumonia, normal size of the heart; **B** — (14.03.2005) partial regression of pulmonary infiltrates, enlargement of the heart (cardiac shock); **C** (08.05.2006) persistent evident enlargement of the heart (tab. 2, patient 16)

tients the changes progressed rapidly, as is the case with diffuse alveolar haemorrhage, a rare pulmonary manifestation of CSS (3%) [7].

Peripheral neuropathy is one of the most common and very characteristic clinical manifestations of CSS. Its prevalence is estimated at 75–81% [10, 13]. Its most common form is mononeuritis multiplex, and it most commonly affects the peroneal nerve. Although biopsy is the gold standard in the diagnosis of neuritis in the course of vasculitis, a histological confirmation can only be obtained in about half of the patients, and in most cases the histopathological examination reveals non-specific degenerative changes in the nerve. Sometimes the involvement of the nervous system runs a dramatic course and may take the form of tetraparesis. In most of these cases, however, the response to treatment is good with only mild sequelae, such as paraesthesia [10]. In our study population the prevalence of clinically overt nervous system involvement was not as high as that reported in the literature (42.1%). The manifestations of peroneal neuritis or polyneuropathy that were the reason for initiating the diagnostic investigation were present in 16 out of 38 patients and were all mild. One patient also had manifestations of CNS involvement in the form of convulsions and hemiparesis. Three patients underwent a nerve biopsy, which failed to provide a histological confirmation of vasculitis.

Cutaneous changes in the course of CSS develop in more than a half of the patients [7, 14]. In our patients, cutaneous manifestations were observed less frequently (in 23.6% of the patients). In 3 patients, necrotising vasculitis was confirmed histologically.

Abdominal pain, bloody diarrhoea, vomiting, and bowel obstruction are fairly commonly seen in patients with CSS. If they are accompanied by hypereosinophilia, they should always put the

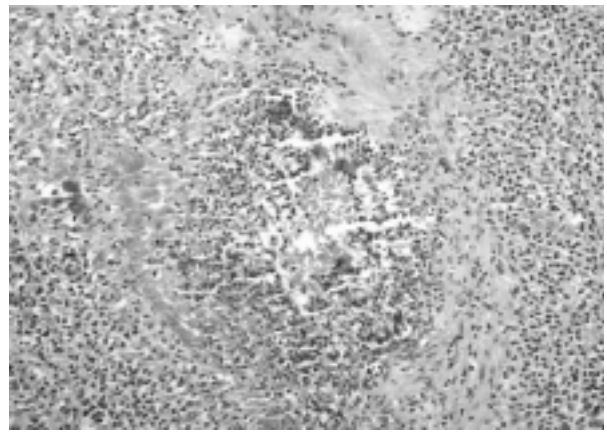

Figure 3. Blood vessel infiltrated by inflammatory cells with eosinophils and focal fibrinous necrosis.(tab. 2., patient 2)

doctor on his or her guard, as they may be associated with gastrointestinal involvement by the vasculitis, which is seen in a third of the patients [10] or even more frequently [5]. Della Rosa et al. analysed 19 patients and showed gastrointestinal involvement in over 47% of them [8]. From the pathologist's point of view, the development of the signs and symptoms has two mechanisms: accumulation of eosinophils in the intestinal wall (diarrhoea, haemorrhage, bowel obstruction) or in the serous membranes (ascites, peritonitis) accompanied by vasculitis of the mesentery, which is manifested by bowel ischaemia, ulceration, and perforation. Peritonitis, hepatitis and cholecystitis are much less frequently seen. In our material, manifestations of gastrointestinal involvement, which were the reason for initiating the diagnostic investigation, were present in 6 out of 38 patients (15.8%).

In 23 out of 38 patients (60.5%) the diagnosis of CSS was established on the basis of cardiac manifestations suggestive of myocardial involve-

Table 3. Histological confirmation of eosinophilic granulomatous vasculitis in 13/38 own CSS patients

Case (no)	Number of patients	Organ, from which biopsy vasculitis was histologically proven
25	1	Large intestine
18	1	Mediastinal lymphnodes
8, 23, 30	3	Bronchus
17, 31	2	Skin
19	1	Peripheral lymphnodes, jelito grube/large intestine
2	1	Bronchus, gallbladder, large intestine, abdominal lymphnodes
13	1	Lung, skin
16, 36	2	Lung
34	1	Stomach

Table 4. Organ involvement frequency in own material and comparison with other investigators

Clinical manifestations organ involves	Owns CSS patients (n = 38)	Reid et al. [17] (n = 23)	Solans et al. [19] (n = 32)	Della Rosa et al. [8] (n = 19)	Keogh i Specks [11] (n = 91)	Guillevin et al. [7] (n = 96)
Asthma	34 (89.5%)	22 (96%)	32 (100%)	19 (100%)	90 (99%)	94 (98%)
Upper respiratory tract/polypus	29 (76%)	12 (52%)	Brak informacji	10 (47%)	67 (74%)	44 (72%)
Low respiratory tract/lung	36 (94.7%)	11 (48%)	17 (53%)	7 (37%)	53 (58%)	36 (37%)
Peripheral nervous system	16 (42.1%)	16 (70%)	14 (43.8)	11 (57%)	69 (76%)	71 (77%)
Skin	9 (23.6%)	14 (60.8%)	22 (68.8%)	12 (63%)	52 (57%)	17 (19%)
Heart	23 (60.5%)	16 (69.5%)	9 (28%)	8 (31%)	12 (13%)	12 (23%)
Bowel	6 (15.8%)	10 (43%)	12 (37.5%)	9 (47.3)	28 (31%)	30 (31%)

ment, which was subsequently confirmed by echocardiography and MRI. The myocardium is a critical organ, which may be affected by inflammation in the course of CSS. The prevalence of myocardial involvement is estimated at several to up to 50% [7, 13, 15], as confirmed by autopsy, in which more than 50% had signs of myocarditis [10]. Myocardial injury results from the effects of toxic mediators released by eosinophils. Another mechanism involves small-vessel vasculitis in the myocardium or, less frequently, coronary arteritis, which can sometimes lead to myocardial infarction. The range of cardiac manifestations is very wide and includes: myocarditis, myocardial ischaemia and infarction, cardiac arrest, valvular heart disease, pericardial disease (pericardial effusion), and sudden cardiac death. Complications include endocardial fibrosis, restrictive cardiomyopathy, chronic heart rate with low ejection fraction, and thrombi in the cardiac chambers [10, 13]. Almost all these manifestations and complications were observed in our patients. The most sensitive method for the detection of myocardial abnormalities, including clinically covert ones, is MRI, which is also indicated for the monitoring of treatment outcomes [16]. The involvement of the myocardium by inflammation and its consequences are the most common cause of death in patients with CSS [15]. Guillevin et al. analysed 96 cases and observed myocardial involvement in 13 patients (13.5%), 8 of whom (more than half) died despite the treatment [7]. In our study population, one patient died in the course of a second myocardial infarction (Case 13) and another patient is awaiting a heart transplant.

Renal involvement of inflammation must also be mentioned while discussing the clinical manifestations of CSS. The kidneys are generally rarely affected in CSS (fewer than 25% of patients) [8, 10, 13] with higher involvement rates being reported only in the United Kingdom (50–80%) [17]. The most common clinical manifestation is proteinuria, with haematuria being seen less frequently. In our group of 38 patients, only two (5.2%) presented with signs of renal involvement in the form of proteinuria without renal failure. It may well be that most of the patients with vasculitis affecting the kidneys are referred to nephrologists rather than pulmonologists.

The fewest diagnostic problems were encountered in patients in whom the suspicion of CSS could be confirmed by histopathology. Such patients accounted for 34.2% of our study population. For comparison, Reid et al. analysed 23 patients and found that only 4 of them, including 3 post mortem in an autopsy, met all of the pathological criteria proposed by Churg and Strauss [17]. Similarly, Solans et al. confirmed histologically eosinophilic necrotising vasculitis only in 15 out of 32 patients [18].

Conclusions

The diagnosis of CSS is difficult and problematic, which results from the diversity of clinical manifestations, the lack of straightforward diagnostic criteria and the fact that eosinophilic necrotising vasculitis can be confirmed histologically in a small fraction of patients due to the commonly grave condition of patients and the fulminant clinical manifestations, and due to the previous glucocorticosteroid treatment which masks the histopathological presentation of the changes. Nevertheless, based on the rate of organ-specific changes in our patients, which was similar to that reported elsewhere, it seems that the clinical manifestations proposed by Lanham and Guillevin may become generally useful diagnostic criteria of CSS, also among patients admitted to pulmonology wards. This conclusion is supported by the recommendations of the European League Against Rheumatism (EULAR), which suggests that, while in patients with suspected CSS, biopsy should be performed, if possible, as it may aid the diagnosis, clinical presentation with a thorough differential diagnosis plays the most important role and should be the basis for the final diagnosis [19].

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