Screening for celiac disease in idiopathic pulmonary hemosiderosis

Dépistage de la maladie cœliaque dans l’hémosidérose pulmonaire idiopathique

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Summary

Aim. — The aim of this report was to screen for celiac disease (CD) in patients with idiopathic pulmonary hemosiderosis (IPH).

Patients and methods. — Patients with IPH treated at the Children’s Hospital of Tunis between 1976 and 2006 were reviewed and investigated for CD, using serological and histological tests.

Results. — A total of 10 children (two boys and eight girls) had IPH. The mean age at diagnosis was 3.1 years. Three had digestive symptoms and positive CD serology, which was confirmed by histological data. Clinical and radiological findings improved markedly in all CD patients with corticosteroid treatment combined with a gluten-free diet. Symptoms of IPH and CD both returned in one patient who stopped the gluten-free diet.

Conclusion. — Three of our 10 patients with IPH also had CD. These data illustrate the close etiopathogenic link between IPH and CD, and strongly suggest that CD be looked for in IPH patients, especially in those with symptoms suggestive of CD.

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Abbreviations: IPH, idiopathic pulmonary hemosiderosis; CD, celiac disease; ANA, antinuclear antibodies; anti-DNaseA, antidideoxyribonuclease antibodies; ANCA, antineutrophil cytoplasmic antibodies; Anti-GBMA, antiglomerular basement membrane antibodies; AGA, antigliadin antibodies; ARA, antireticulin antibodies; EmA, antiendomysial antibodies; anti-tTGA, antitissue transglutaminase antibodies.

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Idiopathic pulmonary hemosiderosis (IPH) is a rare disorder in children of unknown etiopathogeny, characterized by recurrent episodes of a triad comprising diffuse alveolar hemorrhage, hemoptysis and iron-deficiency anemia. So far, few cases of celiac disease (CD) in association with IPH have been reported in the literature[1—5]. The rarity of both conditions leads some authors to consider it a coincidental association [1]. To clarify the nature of this association, we looked for CD in 10 patients with IPH treated at the Children’s Hospital of Tunis.

Patients and methods

Patients

Patients with IPH treated at the Children’s Hospital of Tunis from 1st January 1976 to 31st December 2006 were reviewed. IPH, characterized by recurrent episodes of a triad of diffuse alveolar hemorrhage, hemoptysis and iron-deficiency anemia, was confirmed by the presence of hemosiderin-laden macrophages in the bronchoalveolar lavage fluid and/or gastric washing fluid.

The patients’ records were evaluated in terms of age, gender, clinical pattern, associated diseases, diagnostic methods, treatment and outcome. Other causes of diffuse alveolar hemorrhage were excluded by specific investigations. Echocardiography showed neither mitral stenosis nor pulmonary hypertension. Laboratory investigations showed normal renal and liver function. Immunological tests were negative for antinuclear antibodies (ANA), antideoxyribonuclease antibodies (anti-DNaseA), rheumatoid factor, antineutrophil cytoplasmic antibodies (ANCA) and antiglomerular basement membrane antibodies (anti-GBMA).

Methods

All patients were investigated for CD by serological screening and intestinal biopsy, even when serological tests were negative. Immunological tests included antireticulin (ARA), antiendomysial (EmA) and antigliadin antibodies (AGA) of IgG and IgA isotypes, as well as antitissue transglutaminase (anti-tTGA) antibodies. Quantitative serological screening and titration of anti-tTGA became available in Tunisia only by the time that the last four patients were being screened. The diagnosis of CD was confirmed on the basis of positive serological tests, total villous atrophy on intestinal biopsy, and clinical and serological remission with a gluten-free diet. All parents gave their consent for the serological and histological investigations.

Results

Ten children (two boys, eight girls) had IPH, and seven of these 10 children were the result of consanguineous marriage. The mean age at diagnosis was an average of 3.5 years (range: 1—11 years). Clinical patterns and diagnostic methods are shown in Tables 1 and 2. All patients had recurrent episodes of fever and anemia syndrome, with pallor and asthenia associated with respiratory symptoms of cough in nine patients, and hemoptysis and dyspnea in seven. Two patients developed acute respiratory failure and required mechanical ventilation. All patients had evidence of bilateral pulmonary infiltrates on chest radiography. The mean rate of hemoglobin was 4.9 g/dL (range: 2.3—9 g/dL). The diagnosis of IPH was confirmed by the presence of hemosiderin-laden macrophages in the bronchoalveolar lavage fluid (n = 5/10) and gastric washing fluid (n = 8/10). The diagnosis was identified at the time of the first exacerbation in six patients and after more than two exacerbations in four. One patient had cardiomyopathy with no valve anomalies (Table 1, Observation 4). Clinical manifestations of CD were sought in all patients: three had gastrointestinal anomalies (Table 1, Observation 4). Clinical manifestations of CD were sought in all patients: three had gastrointestinal symptoms with chronic diarrhea (Table 1, Cases 3 and 7) and abdominal meteorism (Table 1, Observation 9), and the latter patient had a brother treated for CD. In the first six patients, only qualitative AGA tests were done, four of which were positive. Titration of AGA and anti-tTGA was performed in the last four patients, and their results were: 4.5 IU/L, 0.15 IU/L, 3.2 IU/L and 0.2 IU/L (normal: 0.28—2.22 IU/L); and 41 IU/L, 3 IU/L, 28 IU/L and 1 IU/L (normal: ≤10 IU/L), respectively. The diagnosis of CD was supported in only three patients, all of whom had positive CD serology with more than three positive markers (IgA isotypes of AGA, ARA, EmA and anti-tTGA) and total villous atrophy on intestinal biopsy. Three intestinal biopsies were obtained from the second part of the duodenum in all patients, and showed total villous atrophy with intraepithelial lymphocytes and crypt hypertrophy in the three symptomatic CD patients. Immunophenotyping was not carried out due to technical problems. Only the symptomatic CD patients had positive CD serology and intestinal villous atrophy on their biopsies. Otherwise, parasitic stool tests in those with digestive symptoms and villous atrophy on intestinal biopsy were negative (Table 2).

All patients were given symptomatic treatment with oxygen, blood transfusions, antibiotics and glucocorticoid pulse therapy in the acute phase, followed by oral low-dose prednisone (0.5 mg/kg) for two days. Two
patients required azathioprine treatment because of frequent exacerbations (Observation 7) and femoral head necrosis (Observation 8) with corticosteroids. Patients with CD were started on a gluten-free diet (Cases 3, 7 and 9), and their clinical and radiological course was markedly improved. Digestive symptoms disappeared and respiratory exacerbations became infrequent with the low-dose oral corticosteroid therapy and gluten-free-diet. In addition, the laboratory follow-up showed hemoglobin rates within the normal range and negative serological tests. However, no intestinal biopsies were performed to confirm CD remission histologically. Repeated dietary questioning revealed that the three CD patients were following the gluten-free diet. However, 30 months after beginning treatment, symptoms of both IPH and CD returned in Patient 7 on stopping the gluten-free diet. Frequent severe exacerbations of IPH recurred despite the fact that the patient continued to take prednisone regularly. Patients were evaluated for a mean follow-up period of seven years (range: two months to 14 years). Lung function was compromised in three patients (Cases 1, 4 and 6), and the poor respiratory prognosis in these patients was attributed to diagnostic and therapeutic delays.

Discussion

IPH is an unusual disorder in children. Only about one new case of IPH every three years is diagnosed in our single-
center institution. IPH is more frequent in females than males (gender ratio: 5:1). Although the association of IPH and CD has been rarely reported in the literature, it occurs in nearly three out of 10 patients. The first report of an association between IPH and CD was by Lane et al. in 1971 [6]. The high-frequency of CD in our series may be attributed to the high prevalence of CD in children in Tunisia, which has been evaluated to reach 1/157 to 1/170 among schoolchildren aged 8—10 years [7]. Yet, screening for CD in IPH patients remains controversial. Reading et al. [3] advocate routine intestinal biopsy for all IPH patients, even in the absence of clinical symptoms, whereas Pacheco et al. [5] recommend intestinal biopsy only for patients with positive AGA or ARA of IgG and IgA isotypes. Perelman et al. suggest an intestinal patency test with lactulo—mannitol for all patients with IPH [4]. In our series, only symptomatic patients showed positive CD serology and intestinal villous atrophy on biopsy. In fact, villous atrophy was not consistently observed, and was never seen when serology was negative or digestive symptoms were absent. Thus, CD should be looked for specifically in IPH patients who have digestive symptoms. Furthermore, even in the absence of gastrointestinal symptoms, Malhotra et al. [8] suggest that CD be sought in patients with IPH when the severity of anemia is disproportionate to radiological findings. Screening for CD should be performed with the use of EmA and anti-tTGA, whereas AGA may still be useful in young children. Nevertheless, although positive serology is an important biochemical basis for a diagnosis of CD, intestinal biopsy remains the gold standard [9].

Many previous studies suggest that treatment of CD could lead to remission of IPH [3—5,7,9]. However, the clinical and serological remission of both IPH and CD achieved with a gluten free-diet in CD patients (Cases 3, 7 and 9) are confounded, as the patients also received concomitant corticosteroids. Nevertheless, although CD remission was not confirmed by histology, the return of symptoms of both IPH and CD in the patient who stopped the gluten-free diet—despite continuing corticotherapy—favours an immunological gluten-dependent mechanism. The immunoallergic pathogenesis of IPH has been previously suggested with Heiner syndrome [10]. Also, three pathogenic hypotheses to explain the association of IPH and CD are discussed in the literature: deposition of circulating immune complexes involving food allergens on the basement membrane of alveolar capillaries; reaction between ARA and alveolar basement membrane antigen; and an effect of adenovirus 12, a potential causative factor for CD [11]. In conclusion, although the association of IPH and CD has been rarely reported, it was seen in three out of 10 patients in our series. Investigation of CD in IPH was positive only in patients with digestive symptoms. The relapse of both IPH and CD symptoms in the patient who stopped the gluten-free diet supports a gluten-dependent mechanism for IPH. These data illustrate a close etiopathogenic link between IPH and CD, and strongly suggest that CD be looked for in IPH patients.

References