Case Report

Human Seminal Plasma Allergy and Successful Pregnancy

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Abstract. Human seminal plasma allergy in women is an uncommon phenomenon. A great variety of reactions ranging from local swelling to generalized systemic reactions have been described, and local symptoms have often been misdiagnosed as chronic vulvovaginitis. Sperm barriers, such as condoms, are the most widely advocated method for avoiding these reactions; however this is not acceptable to couples who wish to have children. We present a case of a woman with human seminal plasma allergy who became pregnant after a fourth cycle of artificial insemination. Sodium dodecyl sulfate polyacrylamide gel electrophoresis immunoblotting showing an IgE binding band at 28kDa in the husband's seminal fluid identified the culprit allergen. Artificial insemination is an effective way to achieve a pregnancy in patients with seminal plasma allergy.

Key words: Human seminal plasma allergy. Artificial insemination.

Resumen. Las reacciones de hipersensibilidad inmediata a líquido seminal son infrecuentes. Se han descrito una gran variedad de síntomas desde prurito localizado a reacciones sistémicas. Las reacciones sistémicas no son habituales pero lesiones crónicas o recurrentes a nivel local podrían ser más frecuentes y estar, actualmente, infradiagnosticadas. El uso de métodos anticonceptivos de tipo barrera se ha recomendado para prevenir reacciones alérgicas en estas pacientes pero esta opción no es válida para las parejas que quieren tener descendencia. Se presenta el caso de una mujer con alergia al líquido seminal que tras el cuarto ciclo de inseminación artificial ha conseguido quedar embarazada. En el estudio in vitro del líquido seminal del marido mediante poliacrilamida-dodecil sulfato sódico y posterior inmunotransferencia se observó una banda fijadora de 28 kDa como alérgeno responsable. Aunque actualmente existen diferentes tratamientos válidos en la alergia al líquido seminal humano, la inseminación artificial es un método efectivo para obtener el embarazo.

Palabras clave: Alergia a líquido seminal humano. Inseminación artificial.

Introduction

Immediate hypersensitivity reactions to human seminal fluid have been increasingly recognized and documented. However, no accurate data on the prevalence of such reactions are available, although the disorder appears to be more common than previously believed [1]. Only a few cases involve generalized systemic reactions and seminal plasma allergens have been found in the range from 12 to 75kDa [2-4], and immunotherapy has been recommended. We report a case of successful pregnancy after only 4 cycles of artificial insemination following diagnosis of human seminal plasma allergy by skin prick test before the artificial insemination procedure. Furthermore, a single allergen was identified by immunoblotting as responsible for the anaphylactic reaction.

Case Description

A 38-year-old nulligravida was referred for allergy evaluation because of an anaphylactic reaction after sexual intercourse. She had a history of postcoital facial erythema and angioedema, dyspnea, and breathlessness.

These symptoms occurred immediately after ejaculation during intercourse and she reported that reactions had begun several years earlier. The husband had been the patient's only sexual partner. Although she explained that the use of condoms had completely abolished the symptoms, this option was not acceptable since the couple wanted to start a family.

She had a family and personal history of atopy. At the age of 18 she was diagnosed with bronchial asthma and sensitization to dog epithelium; some years later she began immunotherapy to dog epithelium.

Because the patient wanted to become pregnant an allergy study was carried out and she was enrolled in the artificial insemination program.

Skin Prick Tests

The skin prick tests were performed with a standardized technique: reactions were read after 15 minutes by measuring the mean diameter of the papule and erythema induced by the allergen. The test was considered positive when the diameter of the papule was equal to or greater than that produced by histamine, or 3 mm greater than that produced by saline solution (following the recommendations of the European Society of Allergy and Clinical Immunology) [5]. Histamine (10 mg/mL) and saline solution were used as positive and negative controls, respectively.

Prick tests with inhalant allergens, food extracts, and latex disclosed an immediate hypersensitivity to dog epithelium as the only positive result. The patient had had a dog at home for 10 years. Human and bovine serum albumin (BSA) (Bial–Aristegui, Bilbao, Spain) prick tests were negative. Subsequently, prick tests with the patient's husband's fresh whole semen elicited a clearly positive response, whereas the prick with sperm devoid of seminal plasma proteins was negative. Both partners were negative for human immunodeficiency virus. Prick tests with human seminal plasma were not performed in control subjects for ethical reasons because of the risk of sensitization or infection.

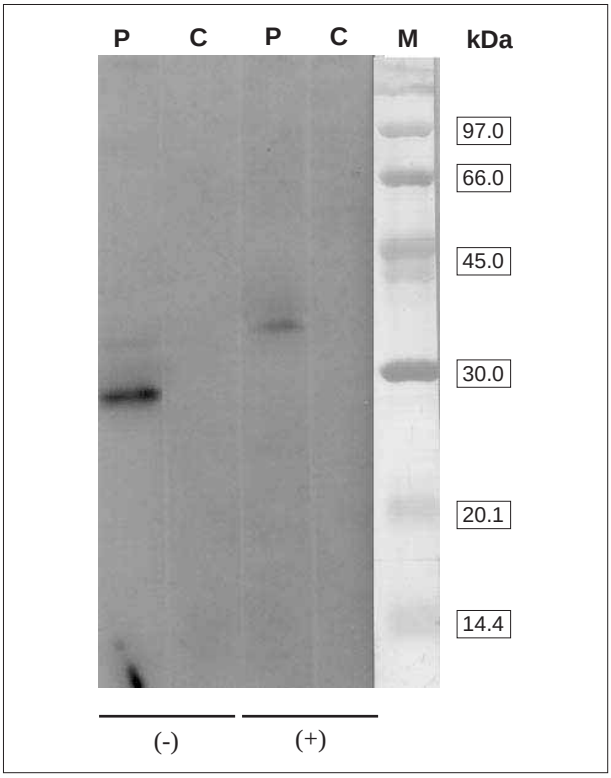
In Vitro Allergy Tests

Total IgE and seminal fluid-specific serum IgE were measured by fluorescent-enzyme immunoassay (CAP-System, Pharmacia, Uppsala, Sweden). The total IgE determination was 329 kU/L (normal value, <100 kU/L); the concentration of specific IgE to dog epithelium and seminal fluid were 30.8 kU/L and 0.91 kU/L, respectively.

Sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) immunoblotting was carried out with the husband's whole seminal plasma with and without 2-mercaptoethanol. The immunoblotting identified IgE-binding bands of 34.6 kDa and 28 kDa in 2-mercaptoethanol-treated and non-treated samples, respectively (Figure).

Artificial Insemination

The husband's seminal fluid was processed to remove allergenic components. Artificial insemination was performed following a previously published protocol [6]. Four artificial insemination cycles were performed, the last of which resulted in a successful pregnancy.



Sodium dodecyl sulfate polyacrylamide gel electrophoresis immunoblotting. Lane P, patient's serum. Lane C, control serum (pool from nonatopic subjects' serum). Lane M, molecular weight pattern. (+) indicates 2-mercaptoethanol treated samples; (-) samples not treated with 2-mercaptoethanol.

Discussion

Immediate hypersensitivity reactions to human seminal fluid range from local swelling to generalized systemic reactions [1, 2, 7-9]. Local symptoms may be more frequent than systemic reactions but are underdiagnosed. The third decade of life is the commonest period for the appearance of clinical manifestations. In some cases, hypersensitivity reactions to seminal plasma have occurred after an intercourse-free period, such as after pregnancy, hysterectomy, menopause, or partial prostatectomy in the partner. Although the most common mechanism to explain this clinical picture is an IgE mediated reaction, type III and IV immunological reactions have been documented [2]. In our patient the reaction was IgE mediated.

Since the first reports in which the humoral immune response suggested serum sickness-like reaction 6 to 10 days after follicle aspiration, BSA present in the follicle rinsing has been suspected [10, 11]. Other anaphylactic reactions related to the BSA and penicillin used in the semen culture medium have also been described after artificial insemination [12-14]. These causes were not involved in our patient.

Several seminal plasma allergens have been characterized and their molecular masses reported to range

from 12 to 75 kDa [2-4]. In our patient, an IgE-binding band of 34.6 kDa was identified in SDS-PAGE immunoblotting treated with 2-mercaptoethanol and another of 28 kDa in the untreated SDS-PAGE. Allergenic antigens could reside in a glycoprotein fraction of seminal plasma since allergenicity of the fluid is not changed after a vasectomy [2].

Sperm barriers are usually recommended to prevent allergic reactions in human seminal plasma-allergic patients. However, this is not an acceptable alternative for couples who wish to achieve pregnancy. Therefore, other options like artificial insemination have been proposed. Two cases of patients with allergy to both latex and seminal plasma have been described [15].

In 1981, Shapiro et al [16] reported the first successful induction of pregnancy after artificial insemination in a woman with human seminal fluid allergy. In that case, 7 cycles of artificial insemination were performed and a pregnancy was achieved. Another case of successful pregnancy after artificial insemination with sperm devoid of seminal plasma proteins was described by Iwashashi et al [17]. In both cases, more than 4 cycles of insemination were required.

In 1967 Halpern et al [18], were the first to try immunotherapy to treat human seminal allergy. Subsequently, attempts with parenteral immunotherapy have been reported using a conventional method or, more recently, a rush protocol [2, 3, 19]. In recent decades, local intravaginal desensitization has been reported [2, 4, 20, 21]. This treatment option does not require complicated preparation and could be an alternative for treating seminal plasma-allergic patients. To maintain the tolerant state after all these treatments, patients need to have regular unprotected sexual activity.

This case of successful pregnancy after only 4 cycles of artificial insemination confirms this approach as an alternative for patients with human seminal plasma allergy who wish to become pregnant. Immunoblotting showed the 28 kDa allergen to be responsible for the reaction in our patient and application of washed semen as normally used in the artificial insemination protocols circumvented the allergic reaction.

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