

## CASE REPORT

# Management of common variable immunodeficiency by subcutaneous IgG self-administration during pregnancy – a case report

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## Introduction

Common variable immunodeficiency (CVID) is the most prevalent symptomatic primary immunodeficiency, characterized by an impaired antibody response associated with severe and recurrent bacterial infections [1, 2]. Immunoglobulin (Ig) replacement therapy, that may be administered intravenously (IVIG) or subcutaneously (SCIG), is the only effective treatment for CVID patients, and is essential during pregnancy [3, 4]. In pregnant CVID women, IgG replacement therapy poses an even greater challenge to ensure sustained IgG serum levels, and hence adequate IgG mother to fetus placental transfer. This protects the infant against infection at birth, when the immune system is still functionally immature [5–7]. Due to its efficacy, lifelong IVIG replacement therapy has been the gold standard in CVID management so far, but IVIG may not be suited to all patients and, importantly, it may be associated with adverse systemic effects that would pose yet further risk for the

### Key Clinical Message

Patients with common variable immunodeficiency are prone to infections, and this poses a particular challenge during pregnancy, when the requirement for immunoglobulin (Ig) replacement therapy is even more demanding so as to achieve an effective protection also of the fetus. This case report highlights the benefits observed with subcutaneous IgG self-administration in the management of common variable immunodeficiency (CVID) during pregnancy, in terms of efficacy and safety.

### Keywords

Common variable immunodeficiency, pregnancy, self-infusion, subcutaneous immunoglobulin.

fetus. Thanks to the technical advances in IgG formulation; pure, highly concentrated SCIG preparations have been developed that are increasingly being used worldwide, albeit very variably in different countries. Unlike IVIG, SCIG is easy to self-administer, and hence improves the patient's quality of life. SCIG self-administration is becoming a successful and cost-effective option for CVID management, and is gaining considerable acceptance also among patients, who thereby have greater control over their own therapy [8].

Here we report the case of a pregnant patient treated with SCIG therapy. We focus on the efficacy of the new 20% SCIG formulation employed in her management.

## Case History

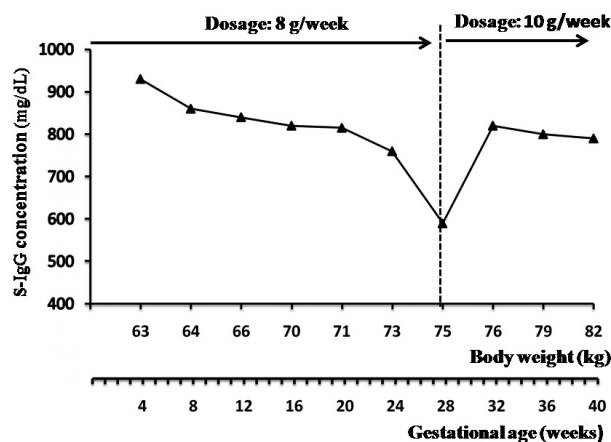
A 36-year-old Caucasian woman was diagnosed with idiopathic thrombocytopenic purpura in 2008 during her first pregnancy. Although hypogammaglobulinemia was present at that time, it was not further investigated.

In 2010, her medical condition was remarkable for monthly recurrences of lower respiratory tract infections. She was diagnosed with CVID in August 2011. Laboratory examinations revealed extremely low levels of all serum Ig isotypes: IgG 73 mg/dL (normal values = 700–1600 mg/dL), IgA 16 mg/dL (68–380 mg/dL), IgM 7 mg/dL (40–230 mg/dL). Isohemagglutinins were absent and she had an impaired response to the tetanus vaccination booster.

### Treatment, outcome, and follow-up

As from October 2011, the patient was treated with human 16% IgG preparation administered by subcutaneous route. Then, since January 2012, she has been treated with Hizentra® (CSL Behring) 200 mg/mL, 20% at a dosage of 100 mg/kg every 7 days (8 g/week), because the 16% formulation was no longer available. This new 20% formulation needs to be administered exclusively by subcutaneous route, and after a period of adequate training under close medical staff support she continued the SCIG administration as a self-infusion at home. The 20% IgG preparation offers several important advantages: the small infusion volume required, high infusion rate, short duration of weekly infusions, and decrease in the number of administration sites required [9, 10]. The patient had been under treatment for at least 1 year when she became pregnant; the serum IgG levels before pregnancy ranged from 600 to 930 mg/dL, and no bacterial infections occurred. After the patient became pregnant, in August 2012, it was decided that she should continue the SCIG therapy with Hizentra.

She was informed about the importance of regular SCIG self-administration for IgG replacement therapy during pregnancy, in particular, in order to prevent intrauterine infections. Starting from the fourth week of pregnancy, she was asked to refer to our unit every month until the end of the pregnancy for body weight and serum Ig levels monitoring to adjust the SCIG dose. Accordingly, she was prescribed 8 g/week SCIG therapy until the end of the second trimester, and 10 g/week thereafter, starting from the 28th week and until delivery. This treatment schedule ensured serum IgG levels within the normal range. Figure 1 shows the treatment schedule adopted and the patient's normal range IgG serum levels. At the 28th week, nephelometry revealed low levels of IgG (<600 mg/dL) caused by the physiological increase in body weight and by the increase in the IgG distribution space due to plasma volume expansion. Thus, to ensure protective IgG levels, it was decided to increase the SCIG dose therapy to 10 g/week until delivery. At the 40th week, she gave birth to a normal healthy female by spontaneous vaginal childbirth. On the day of childbirth she



**Figure 1.** IgG levels in the serum of CVID pregnant woman treated with self-infusion IgG. The dosage was adjusted according to the body weight gain and serum IgG levels during the gestational period. Ordinate: serum IgG (S-IgG) concentration. Abscissa: body weight gain and the corresponding gestational age.

did the SCIG infusion. Two days later, the IgG levels of the baby were within the normal range (910 mg/dL), whereas those of the mother were just below (500 mg/dL). The mother continued her SCIG self-administration weekly. Two months later, IgG levels of the baby were 710 mg/dL and of the mother were 860 mg/dL.

### Conclusions

The reported clinical case demonstrates that subcutaneous administration of the new 20% IgG preparation was a successful and safe therapeutic option for CVID management also during pregnancy. Patients adequately trained in self-administration with the help of a skilled team can easily become confident with the procedure and our patient showed very good compliance. SCIG self-administration ensures stable, high-serum IgG levels and adequate mother to fetus transfer, effectively protecting both against infections. The functionally immature immune system of the baby was shown to be well protected. In comparison to IVIG, the SCIG self-administration offers several benefits: SCIG results in more sustained IgG levels, avoiding the peaks and troughs associated with IVIG, was not associated with adverse systemic events in our patient, did not require premedication or hospitalization, and the therapy costs were substantially reduced [9–12]. In conclusion, SCIG self-administration is a great advance in CVID management also during pregnancy, remarkably reducing the health risk for both the mother and the child.

### Conflict of Interest

None declared.

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