

## Chronic Excessive Alcohol Consumption and Male Fertility: A Case Report on Reversible Azoospermia and a Literature Review

Bruno Guthauser<sup>1,2,\*</sup>, Florence Boitrelle<sup>2,3</sup>, Arnaud Plat<sup>4</sup>, Nicolas Thiercelin<sup>5</sup> and Francois Vialard<sup>2,3</sup>

<sup>1</sup>Department of Reproductive Biology, Dreux Hospital, Dreux, France, <sup>2</sup>Department of Reproductive Biology and Cytogenetics, Poissy Saint Germain Hospital, Poissy, France, <sup>3</sup>University of Versailles Saint-Quentin-en-Yvelines, Versailles, France, <sup>4</sup>Department of Addictive Diseases, Beaujon Hospital, Clichy, France and <sup>5</sup>Department of Addictive Diseases, Dreux Hospital, Dreux, France

\*Corresponding author: Centre Hospitalier de Dreux, 44 Avenue du Président Kennedy, F-28100 Dreux, France. Fax: +33-237-515134; E-mail: brunoguthauser@gmail.com

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**Abstract — Aims:** The aim of this work was to report on a heavy drinker whose azoospermia was reversed after alcohol withdrawal. We also review the literature on links between alcohol consumption and azoospermia. **Method:** This study is a clinical case report and a literature review. **Results:** Two years after alcohol withdrawal, a child was born following assisted reproduction technique. Excessive alcohol consumption (i.e. more than 60 g a day) is strongly associated with azoospermia and this condition may be reversible after alcohol withdrawal. **Conclusions:** Testicular biopsies should be contra-indicated for heavy drinkers, and in order to increase the chances of obtaining a pregnancy, alcohol abstinence should be encouraged in male with low-to-moderate alcohol intakes.

### INTRODUCTION

Male fertility can be damaged by excessive alcohol consumption, though a direct effect on the testes (Anderson *et al.*, 1980) and/or a dose-dependent depression of plasma testosterone levels (Mendelson *et al.*, 1977; Valimaki *et al.*, 1984). Although a number of studies have examined semen parameters in patients with excessive alcohol consumption (Gomathi *et al.*, 1993; Goverde *et al.*, 1995; Curtis *et al.*, 1997; Jensen *et al.*, 1998; Marinelli *et al.*, 2004; Muthusami and Chinnaswamy, 2005), the findings have differed. There are few reported studies in heavy drinkers (i.e. those consuming >60 g of alcohol a day), although the results have been more homogeneous (Lloyd and William, 1948; Brzec, 1987; Pajarinen *et al.*, 1996; Vicari *et al.*, 2002; Mills and Meacham, 2007; Sermondade *et al.*, 2010). Here, we report on an alcoholic patient receiving cross-disciplinary medical care from an addiction medicine physician and an andrologist/embryologist. Alcohol withdrawal was associated with the reversal of azoospermia and a healthy live birth in an assisted reproductive technology (ART) programme with intracytoplasmic sperm injection (ICSI). We also review the literature, discuss the relationship between excessive alcohol consumption and male infertility and comment on opportunities for the use of ART in this context.

### CASE REPORT

#### Patient

A 27-year-old male was hospitalized in March 2009 for acute pancreatitis. An episode of delirium tremens during his stay in hospital indicated the presence of a severe physical dependence syndrome and prompted a consultation with an addiction medicine physician. The patient admitted to excessive alcohol consumption for the previous 5 years, with a notable increase in intake over the last 12 months after having witnessed the death of colleague in a workplace accident. He was drinking >150 g of alcohol a day (two bottles of wine or the equivalent)

and was smoking 10 cigarettes a day. During his stay in hospital, he was referred to our ART unit for a fertility evaluation. He and his partner had not conceived a child in the 6 previous years. There was no history of cryptorchidism, orchitis or testicular torsion and the patient had not undergone chemotherapy or radiotherapy.

#### Treatment for alcohol addiction

After consultations with an addiction medicine physician and a psychiatrist, an anxiolytic (cyamemazine) and hypnotherapy were prescribed as supportive treatments for the patient's voluntary abstinence from alcohol.

#### Fertility evaluation and ICSI

Several sperm analysis were performed ( $n = 5$ ), from the time of alcohol withdrawal to 20 months later. Semen parameters were evaluated according to the fourth and fifth editions of the World Health Organization's guidelines (WHO, 1999, 2010). Sperm morphology was assessed according to strict criteria (Menkveld *et al.*, 1990). Twelve months after alcohol withdrawal and after 7 years of infertility, ICSI was indicated for severe teratozoospermia (as defined by Palermo *et al.*, 1992). A local ethical committee approved this decision. A standard, long down-regulation *in vitro* fertilization (IVF) protocol was initiated and ICSI was subsequently performed. Sperm preparation for ICSI was performed on a two-layer (45–90%) density gradient (PureSperm<sup>®</sup> from Nicadon, Sweden). The embryo was cultured in IVF Medium<sup>®</sup> (Origio, France).

### RESULTS

#### Alcohol abstinence

With the exception of a relapse in January 2011 and despite the occurrence of episodes of anxiety, the patient has (as of January 2013) maintained his abstinence from alcohol. The patient's alcohol abstinence was associated with an improvement in the relationship with his partner.

Table 1. Light microscopy characteristics of the patient's sperm after alcohol withdrawal

Time after alcohol withdrawal	2 months	4 months	6 months	14 months	22 months
Semen volume (ml)	0.4	1.6	3.2	1.9	1.4
Count ( $\times 10^6$ /ml)	Absence	4.2	28.0	9.5	34.0
Progressive motility (%)	/	15	40	25	5
Normal morphology (%)	/	1	1	2	0

### Male fertility evaluation

Semen parameters are summarized in Table 1. Azoospermia was evidenced by a semen analysis 2 months after alcohol withdrawal and oligo-asthenoteratospermia was observed 2 months later. Normal semen counts and motility were observed 6 months after alcohol withdrawal. Oligospermia and asthenospermia were respectively found 14 and 22 months after alcohol withdrawal. In the five consecutive sperm analyses, the proportion of sperm with a normal shape ranged from 0 to 2%.

### Assisted reproductive technology

For the first ICSI cycle, a single embryo was placed in the uterus but the resulting pregnancy ended in miscarriage. After the second ICSI cycle, a healthy baby (weighing 4 kg and measuring 52 cm) was born after 40.5 weeks of gestation.

## DISCUSSION

Few studies have documented alcohol consumption in men participating in ART programmes. Alvarez and Devouche (2012) reported that 32% of the participants in a French ART programme were consuming alcohol but did not provide precise information on the amounts.

Gomathi *et al.* (1993) observed that parameters such as semen volume, sperm count, sperm mobility and the proportion of normally shaped spermatozoa were significantly worse in chronic alcoholics than in controls. However, Marinelli *et al.* (2004) observed a protective effect of moderate alcohol intake on sperm parameters. Goverde *et al.* (1995) observed a lower percentage of spermatozoa with normal forms in daily drinkers, whereas the other measured semen parameters were within the normal range. In a study of couples planning a first pregnancy, Jensen *et al.* (1998) did not find a dose–response relationship between moderate alcohol consumption (mean number of alcoholic drinks per week: 9.5) and the probability of conception in the first 6 months. Curtis *et al.* (1997) observed an association between low male fertility and a weekly alcohol intake of >130 g. In our patient, the percentage of normally shaped spermatozoa was low (as has been reported elsewhere for subjects with chronic alcohol abuse (Nagy *et al.*, 1986; Gomathi *et al.*, 1993; Goverde *et al.*, 1995; Donnelly *et al.*, 1999; Muthusami and Chinnaswamy, 2005)).

For excessive alcohol consumption (defined as a minimum of 180 ml of alcohol per day for at least 5 days a week and for more than a year), Muthusami and Chinnaswamy (2005) found that sperm concentration, sperm motility and the percentage of morphologically normal sperm were significantly lower than in control subjects.

In an autopsy study of men with a history of consuming between 80 g and 160 g of alcohol per day, Pajarinen *et al.*

(1996) observed partial or complete arrest of spermatogenesis in 54% of cases and Sertoli-cell only syndrome in 9% of cases. Lloyd and William (1948) reported that 75% of men with advanced alcoholic cirrhosis had testicular atrophy. Brzec (1987) described azoospermia in three patients hospitalized in a unit for alcohol abusers. Mills and Meacham (2007) published the case of a patient (daily alcohol consumption: 60 g) with azoospermia on the day of oocyte retrieval for ICSI.

In fact, Brzec (1987) was the first to report the recovery of a normal sperm profile after a patient had abstained from alcohol for 10 weeks. Subsequently, two cases of reversible azoospermia after alcohol withdrawal were described, with daily alcohol consumptions of 90 g (Vicari *et al.*, 2002) and 165 g (Sermondade *et al.*, 2010). For the patient reported by Vicari *et al.* (2002), a pregnancy occurred after alcohol withdrawal. Our patient achieved the same outcome, despite a greater mean daily alcohol consumption (150 g).

We observed a rapid improvement in the sperm profile, since spermatozoa were found just 4 months after alcohol withdrawal. This time scale agrees with the case report by Sermondade *et al.* (2010). We believe that the rapid, positive effect of alcohol withdrawal on spermatogenesis enhanced the patient's will to remain alcohol-abstinent.

In cases of azoospermia, testicular biopsies are performed prior to IVF with ICSI (Jow *et al.*, 1993). Surgical sperm retrieval was unsuccessful for two patients with on-going chronic, excessive alcohol consumption (60 g per day in Mills and Meacham (2007) and 165 g per day in Sermondade *et al.* (2010)).

In conclusion, our literature review and this case report strongly suggest that chronic, excessive alcohol consumption (i.e. >60 g a day) is associated with azoospermia. This condition may be reversible when alcohol consumption is discontinued—even when very high amounts of alcohol (150 g per day, in the present case) are being consumed over a long period (5 years). In alcoholics, testicular biopsies should be delayed until well after the withdrawal of alcohol. Alcohol abstinence should also strongly be encouraged in subjects with low to moderate alcohol intakes, in order to increase the chances of obtaining a pregnancy (whether via ART or not) and improve the future baby's welfare.

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