

## **Intravenous immunoglobulin (IVIG) and plasma exchange for autoimmune encephalitis (AE)**

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### **Background**

Autoimmune encephalitis (AE) happens when the body's immune system mistakenly attacks healthy brain cells, leading to inflammation. It is often characterised by the presence of antibodies within the serum and/or cerebrospinal fluid.

Early treatment with immunotherapies improves the outcomes for patients affected by this often-devastating condition. There are two key immunotherapies that can be employed alongside typical steroids and immunosuppressive medications: intravenous immunoglobulin (IVIG) and plasma exchange.

### **Intravenous immunoglobulin (IVIG)**

Intravenous immunoglobulin (IVIG) is a form of treatment that delivers concentrated antibodies from healthy blood donors directly into the bloodstream through an IV line. An IV line (also known as a catheter or drip) is a soft, flexible tube inserted into a vein, usually in the hand or arm.

The antibodies that are delivered help modulate the immune system and, in the case of AE, can reduce brain inflammation. There are many mechanisms by which inflammation is reduced, including by physically blocking harmful antibodies from targeting brain cells or interfering with inflammatory pathways to decrease the production of pro-inflammatory molecules.

An IVIG infusion can take a few hours, but a full dose may be divided over the course of two to five days. The treatment may be repeated and, in some cases, can last for months.

### **Plasma exchange**

Plasma is the liquid component of blood. Plasma exchange (also called plasmapheresis or PLEX) is a procedure that removes harmful antibodies and inflammatory substances from the blood by filtering the plasma and replacing it with an albumin protein solution. Sometimes donor plasma is used.

The procedure involves using a machine to separate the plasma from the blood cells, which are then returned to the body. Only a small amount of blood is out of the body at any one time.

Plasma exchange is always carried out in a hospital setting by a nurse or technician trained in the procedure. The procedure normally takes a couple of hours and the full treatment course often involves several sessions over a week or two.

## Outcomes

Most people, including children and pregnant mothers, do not have adverse reactions to IVIG or plasma exchange. Indeed, both treatment options are considered safe and effective for autoimmune neurological diseases including AE.

However, possible mild side effects may include fever, shivering, muscle aches, sickness and headaches, particularly if you are receiving the treatment for the first time or after 8 weeks. With plasma exchange, it is possible to experience changes in blood pressure though this is usually harmless. There is also a small risk of children developing an allergic reaction to replacement plasma.

## Other information

More recently, subcutaneous immunoglobulin replacement therapy (SCIG) has been emerging as a possible immunotherapy option for encephalitis.

It requires smaller doses compared to IVIG, which leads to shorter infusion times. It is also possible to self-administer SCIG at home rather than going to the clinic. Furthermore, SCIG offers a cheaper treatment alternative, with a 2017 study in Iran, for example, reporting that the total cost of IVIG and SCIG per year is \$1370 and \$121, respectively.

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