



## GROWTH HORMONE TREATMENT IN CHILDREN AND ADOLESCENTS

A summary from APEG August 2018

Growth hormone (GH) has been used to treat children with growth problems for many years. As with any treatment there are potential side effects, but fortunately significant side effects of GH treatment are rare. This information sheet discusses the known and potential side effects of GH treatment.

### **BACKGROUND:**

Prior to 1985, GH was extracted from human pituitary glands. This form of GH was discontinued when it was discovered it could transmit the virus that caused Creutzfeld-Jacob Disease. Synthetic GH has been available in Australia since 1988. Synthetic GH is artificially made and therefore cannot transmit viruses. More than several hundred thousand children worldwide have now been treated with synthetic GH and carefully monitored for side effects. The known and potential side effects of GH treatment are discussed below.

### **POTENTIAL SIDE EFFECTS:**

#### ***Benign Intracranial Hypertension***

Benign intracranial hypertension has been reported in 1 in 1000 children receiving GH treatment. It is possibly due to the increase in salt and water retention that sometimes happens when starting GH treatment. In this condition, the pressure inside the head increases and children may complain of headache, blurred vision, nausea or vomiting. Benign intracranial hypertension usually develops in the first few months of GH treatment but can occasionally occur later. Benign intracranial hypertension resolves rapidly when GH treatment is stopped. GH can then usually be restarted at a lower dose, and the dose slowly increased without further problems. Children receiving GH treatment who develop persistent headache or visual symptoms should immediately report this to their treating doctor.

#### ***Slipped Capital Femoral Epiphysis***

Slipped capital femoral epiphysis occurs when the growing part of the top of the thigh bone (the femoral epiphysis) slips out of alignment. This occurs more commonly in children who are growing quickly, who are overweight, or who have GH deficiency (particularly after total body irradiation therapy for leukaemia or brain tumours). There is no evidence that slipped capital femoral epiphysis is caused by GH treatment. Children with GH deficiency should be monitored for symptoms, most commonly pain in the hip or knee, or a limp.

#### ***Scoliosis***

Scoliosis, or curvature of the spine, is seen most frequently between the ages of 10 and 15 years and is more common in girls. In children with scoliosis, the degree of the scoliosis may get worse when growth is accelerated by GH treatment. Regular monitoring of these children is advised.

#### ***Risk of Cancer***

GH stimulates the growth of cells, and in theory, may promote the growth of cancers. Long-term studies of adults have suggested a link between the development of a number of cancers (breast, prostate and bowel cancer) and very elevated blood levels of a growth factor, IGF-1. Blood levels of IGF-1 increase as GH levels increase. It is not known however, if these elevated IGF-1 levels are the cause of the cancers, or simply a coincidental finding.

For these reasons, children receiving GH treatment should have their IGF-1 levels checked regularly and be closely monitored for both the recurrence of treated cancers and the development of new cancers.



In theory, the children most at risk of cancer are those who have been treated for a cancer in the past. Large studies involving a wide range of childhood cancers have shown that GH treatment does not increase the risk of recurrence of a previously treated cancer and does not increase the number of new cancers in otherwise healthy children. Recently a large European study suggested that there may be a very small increase in the risk of second cancers (different from the original cancer) in children treated for cancer in the past and who have received GH. Importantly, neither the dose of GH nor duration of treatment appear to increase cancer risk.

The link between GH treatment and cancer remains largely theoretical, therefore ongoing surveillance is required. The current evidence is not sufficiently strong enough to advise against GH treatment in children for whom it is expected to be of benefit.

### ***Risk of Diabetes***

One of the functions of GH is to increase the amount of glucose in the blood at times of stress. It does this by reducing the body's sensitivity to insulin, the hormone that helps transport glucose from the blood into cells in the body. Reduced sensitivity to insulin, if severe, can lead to type 2 diabetes. Most studies, however, do not show an increased rate of type 1 or type 2 diabetes associated with GH treatment.

In children who are susceptible to type 2 diabetes for other reasons (e.g. those treated with high doses of steroids, who are very overweight or who have other medical conditions that decrease insulin sensitivity), GH may promote the development of type 2 diabetes. These children should be carefully monitored.

### ***Long term outcomes of GH treatment***

While a large number of children who have received GH have been followed until the end of childhood, with low rates of side effects as shown above, long term follow-up information (more than 15 years after finishing treatment) is limited.

### **SUMMARY:**

The decision to treat a child with GH should only be made after carefully examining the benefits and risks for that individual child. The potential benefits and risks of GH treatment will vary, depending on the condition being treated and the presence of other medical conditions. All children receiving GH treatment should be reviewed regularly and monitored for possible side effects.

Always make sure you discuss any concerns you may have with your doctor prior to your child starting GH treatment.

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