



Growth Hormone Treatment in Children and Adolescents

Growth hormone 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 growth hormone treatment are rare. This information sheet discusses the known and potential side effects of growth hormone treatment.

BACKGROUND:

Prior to 1985, growth hormone (GH) was extracted from human pituitary glands. This form of GH was discontinued when it was discovered it could transmit the virus, which caused Creutzfeld-Jacob Disease.

Synthetic growth hormone became available in Australia since 1988. Synthetic growth hormone is made artificially and therefore cannot transmit viruses. More than 100,000 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.

SIDE EFFECTS:

Benign Intracranial Hypertension

Benign Intracranial Hypertension (BIH) 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, loss of vision, nausea or vomiting. BIH usually develops in the first few months of growth hormone treatment but can occasionally occur later. BIH resolves rapidly when growth hormone treatment is stopped. GH can usually then be restarted at a lower dose, and the dose slowly increased without further problems.

Children on growth hormone treatment should report persistent headache or visual symptoms immediately.

Slipped Capital Femoral Epiphysis

Slipped capital femoral epiphysis (SCFE) occurs when the growing part (epiphysis) at the top of the thigh bone (femur) slips out of alignment. This occurs more commonly in children:

- who are growing quickly,
- who are overweight,
- or who have growth hormone deficiency (particularly after treatment for leukaemia or brain tumours).

There is no evidence that SCFE is caused by the growth hormone treatment. Children with growth hormone deficiency require close monitoring for the symptoms of SCFE, 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 with growth hormone treatment. Close 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 normal men and women have suggested a link between the development of a number of cancers (lung, breast, prostate and bowel cancer) and elevated blood levels of a growth factor, IGF-I. The amount of IGF-I in the blood increases as GH levels increase. It is not known however, if these elevated IGF-I levels are the cause of the cancers, or simply a coincidental finding.

For these reasons, children on growth hormone treatment have been 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. Very large studies involving a wide range of childhood cancers have shown that growth hormone treatment does not increase the risk of recurrence of a previously treated cancer. Recently a large study has 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. Although the numbers of affected children were small, it seemed that children who had had acute lymphocytic leukaemia were particularly at risk of this, with the second cancer being a bone cancer.

Most studies have shown no increase in the number of new cancers of any type in children on growth hormone treatment. Recently, a long-term follow-up study of growth hormone deficient patients treated as children with growth hormone extracted from human pituitary glands, reported a very small but statistically significant increase in the incidence of bowel cancer compared with the general population. No cases of leukaemia, breast or prostate cancer were found. Although the number of cases was very small, these findings are in keeping with the link between elevated IGF-I levels and bowel cancer in the general population.

The link between growth hormone treatment and cancer remains largely theoretical, ongoing surveillance is required. The current evidence is not sufficiently strong to advise against growth hormone 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 sugar in the blood at times of stress. It does this by reducing the body's sensitivity to insulin, the hormone that helps transport sugar 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 incidence of type 1 or type 2 diabetes associated with GH treatment.

In children who are susceptible to type 2 diabetes for other reasons, (eg. those on high doses of glucocorticoids, who are very overweight or who have other medical conditions that increase their risk of developing type 2 diabetes) GH may promote the development of type 2 diabetes. These children should be carefully monitored.

SUMMARY:

The decision to treat a child with growth hormone should only be made after carefully examining the benefits and risks for that individual child. The potential benefits and risks of growth hormone treatment will vary, depending on the condition being treated, the dose of GH and the presence of other medical conditions.

Any concerns you may have should be discussed with your doctor prior to starting treatment.