ANZSPED
AUSTRALIA AND NEW ZEALAND SOCIETY FOR PAEDIATRIC ENDOCRINOLOGY AND DIABETES

GROWTH HORMONE TREATMENT IN CHILDREN AND ADOLESCENTS

A summary from ANZSPED
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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:

Synthetic GH has been available in Australia since 1988. Several hundred thousand children worldwide have 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:

Idiopathic Intracranial Hypertension

In this condition, the pressure inside the head increases and children may complain of headache, blurred vision, nausea or vomiting. Idiopathic intracranial hypertension has been reported in 1 in 1000 children receiving GH treatment. It is possibly due to increased salt and water retention that sometimes happens when starting GH treatment. Idiopathic intracranial hypertension usually develops in the first few months of GH treatment but can occasionally occur later, and resolves rapidly when GH treatment is stopped. GH can, usually, be restarted at a lower dose which is then 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 development of a limp.

Scoliosis

Scoliosis, or curvature of the spine, is not thought to be caused by GH therapy. It may occur in children with some syndromes, such as Turner Syndrome and Prader Willi Syndrome. It 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, that is stimulated by GH. 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.

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.

As the evidence for a link between GH treatment and cancer is not very strong and the potential risk, if any, is very minimal, it is recommended that any child expected to benefit from GH treatment should be offered the treatment.

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.

LONG-ACTING GROWTH HORMONE

Long-acting growth hormone (LAGH) preparations have recently become available in Australia. These injections are given once a week instead of daily. Some have shown an increased rate of injection-site reactions, however these are mild and short-lived.

Since they have only recently been introduced, long term outcomes of LAGH are not yet available, however short term studies have demonstrated that they are at least as effective as daily GH injections in promoting growth. LAGH may result in sustained high levels of GH and IGF-1 which potentially may impact fat and glucose metabolism and cancer risk. In addition, the development of neutralising antibodies against LAGH may limit their effectiveness.

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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