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Drug Therapy

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4. Corticosteroids

4.1 Description

Corticosteroids are a large group of chemical substances (hormones) that are produced by the human body. The same or very similar substances can be manufactured synthetically and used for the treatment of various conditions including paediatric rheumatic diseases. The steroid given to your child is not the same as those used by athletes to enhance performance.

The full name for the steroids used in inflammatory conditions is glucocorticosteroids or more briefly corticosteroids. They are very potent and fast-acting drugs, suppressing inflammation by interfering with immune reactions in quite a complex manner. They are often used to achieve more rapid clinical improvement of a patient's condition before other treatments used in combination with the corticosteroids start to work.

Apart from their immunosuppressive and anti-inflammatory effects, they are also involved in many other processes within the body, e.g. in cardiovascular function and stress reaction, water, sugar and fat metabolism, blood pressure regulation and others.

Along with their therapeutic effects, there are considerable side effects, associated mainly with long-term therapy with corticosteroids. It is very important that a child is under the care of a physician who is experienced in management of the disease and in minimizing the side effects of these drugs.

4.2 Dosage/modes of administration

Corticosteroids can be used systemically (swallowed or injected into a vein) or given locally (by injection into a joint or topically on the skin or as eye drops in case of uveitis).
Dose and route of administration are chosen according to the disease to be treated, as well as the severity of patient's condition. Higher doses, especially when given by injection, are powerful and act rapidly.
Oral tablets are available in different sizes containing different amounts of the drug. Prednisone or prednisolone are two of the most commonly used.
There is no generally accepted rule for drug dosing and frequency of administration.
A daily dose (often in the morning), usually up to a maximum of 2 mg per kg per day (maximum 60 mg per day) is given. An every other day dose may have less side effects but is also less effect than a daily or split daily dose, which is sometimes necessary to maintain disease control. In severe disease, physicians might prefer to choose high-dose methylprednisolone, which is given as an infusion into the vein (intravenous), usually once daily for several days in a row (up to 30 mg per kg per day with a maximum of 1 g per day) and in hospital setting. Sometimes daily intravenous administration of smaller doses may be used when absorption of oral medication is a problem.
Injection of long-acting (depot) corticosteroid into the inflamed joints (intra-articular) is a treatment of choice in juvenile idiopathic arthritis. Depot corticosteroids (usually triamcinolone hexacetonide) have the active steroid substance bound on small crystals; once they have been injected into the joint cavity, these spread around the inner joint surface and release corticosteroid for prolonged periods, often achieving long-term anti-inflammatory effect.
The duration of this effect is highly variable but usually last many months in most patients. One or more joints can be treated in one session using individual combinations of topical analgesia (e.g. skin anaesthetic cream or spray), local anaesthesia, sedation (midazolam, entonox) or general anaesthesia, depending on the number of joints to be treated and the age of the patient.

4.3 Side effects

Two main types of corticosteroid side effects occur: those resulting from prolonged use of large doses and those resulting from withdrawal of

therapy. If corticosteroids are taken continuously for more than one week, they cannot be stopped suddenly, as this might cause severe problems. These problems develop because of insufficient production of steroids by the body, suppressed by the administration of the synthetic preparation. The efficacy, as well as the type and severity of corticosteroid side effects, is individual and therefore difficult to predict. The side effects usually relate to the dose and administration regimen; e.g. the same total dose would have more side effects if given in divided daily doses than in a single morning dose. The main visible side effect is increased hunger, resulting in weight gain and development of stretch marks on the skin. It is very important for children to keep a well-balanced diet low in fat and sugars and high in fibre to help to control weight gain. Acne on the face can be controlled by topical skin treatment. Problems with sleeping and mood changes with feelings of being jittery or shaky are common. With long-term corticosteroid treatment, growth is often suppressed; to avoid this important side effect in children, doctors prefer to use corticosteroids for the shortest possible period and at the lowest dosage. A dosage below 0.2 mg per kg per day (or a maximum of 10 mg per day, whichever is lower) is thought to avoid growth problems.
Defence against infections may be also altered, resulting in more frequent or more severe infections, depending on the extent of immunosuppression. Chickenpox may run a serious course in immunosuppressed children who haven’t already had chicken pox, so it is very important to alert your doctor immediately when your child either develops the first signs or you realise that he or she has been in close contact with someone who subsequently developed the disease. Depending on the individual situation, injection of antibodies against the chickenpox virus and/or anti-viral antibiotics can be given.
Silent side effects should be monitored for closely during treatment. They include the loss of bone minerals, causing the bones to weaken and become more prone to fracture (osteoporosis). Osteoporosis can be identified and followed by bone densitometry imaging. It is believed that a sufficient supply of calcium (about 1000 mg daily) and vitamin D may be useful to slow down the evolution of osteoporosis.
Eye side effects include cataracts and increased intraocular pressure (glaucoma). If increased blood pressure (hypertension) evolves, a low-salt diet is important. Blood sugar levels can rise, causing steroid-induced diabetes; in this case, a diet low in sugars and fat is needed.

Intra-articular steroid injections are infrequently associated with side effects. There is a risk of some leakage from the joint into the tissues, causing thinning of the fat layer under the skin (sub-cutaneous atrophy) or calcium deposits (calcinosis). The risk of steroid injection-induced infection appear to be extremely low (about 1 per 10,000 intra-articular injections) when performed by an experienced physician.

4.4 Main paediatric rheumatic diseases indications

Corticosteroids can be used in all paediatric rheumatic diseases; they are typically used for the shortest possible period and at the lowest dosage.