'G' for 'Glucocorticoids (in Arthritis)

Introduction

Glucocorticoids, synthetic analogs of natural steroids, are one of the most used anti-inflammatory immunosuppressive drugs in rheumatology specially in various inflammatory arthritis .

What are the various mechanisms of action of glucocorticoids ? How does it help in clinical practice?

- ✓ Glucocorticoid receptors on the cells help in executing the anti-inflammatory effects.
- ✓ Genomic effects take place - leading to translocation of receptors and repressing the pro-inflammatory genes.
- ✓ Non genomic action happens by interaction of receptors with kinases which affect inflammatory signaling pathways.

Genomic dose – Usual dosing in normal situations /urgencies -i.e. 1-2 mg per kg/ day
Non-Genomic dose- Usually needed in emergencies like MAS – i.e.30 mg per kg /do
(Pulse methyl Prednisolone)

What are the various routes of administration in Juvenile idiopathic arthritis ?

Glucocorticoids can be used in patients with arthritis through different routes - topical, intra-articular, oral, or intravenous. But it is of utmost importance to have a **judicious use** of these molecules to have the maximum beneficial effect and minimal side effects.

Topical: In JIA associated uveitis, topical eye drops of prednisolone are used as the first line therapeutic option in conjunction with systemic immunosuppression.

Intraarticular: Intra-articular joint injections are used mostly for oligoarthritis. The molecule used is triamcinolone hexacetonide/ acetonide. This can also be used in patients with polyarthritis or

systemic arthritis when a specific joint flares up. Expert advice is recommended before opting for this mode of treatment .

Oral: This is used as bridging therapy while awaiting the full therapeutic response of DMARDs. Oral prednisone is used at a dose of around 0.3- 0.5 mg/kg/day. Slow tapering allowing DMARDs enough time to start working is often the rule .

Intravenous: IV methylprednisolone is used in severe cases - with Macrophage activation syndrome(MAS) as it is a life-threatening condition .

What are the potential adverse drug reactions of steroids ?

Corticosteroids can have multiple side effects, which need to be monitored on follow up for a child on long term steroids.

Growth retardation:- Glucocorticoid treatment interferes with growth through several mechanisms including inhibiting bone formation, promoting bone resorption, and decreasing growth hormone secretion. Both systemic glucocorticoid use and chronic inflammation from the disease itself contribute to the growth restriction. Inflammation, glucocorticoid therapy, and immobilization all contribute to the suppression of the bone mass in JIA.

Adrenal suppression:- This should be considered in all children receiving glucocorticoids at supraphysiological doses (> 8–12 mg/m2/day hydrocortisone or equivalent) for > 2 weeks.

-Timing, dose, and duration of glucocorticoid therapy could affect the development of adrenal suppression.

-Morning doses, lower doses, and shorter duration lower the risk of adrenal suppression.

Ocular :-The major ophthalmologic adverse events of glucocorticoids are cataract and glaucoma. Both the dose and duration of glucocorticoid therapy seem to affect the risk for ocular adverse events.

Immunosuppression :- Steroid therapy affects both adaptive and innate immune system, increasing the risk for bacterial, viral, and fungal infections. There is no safe lower dose threshold for glucocorticoids for infection risk at therapeutic doses.

How to Follow-up a child on glucocorticoids ? What are the things to Monitor ?

At baseline, an elaborative examination of nutritional, pubertal, growth and vaccination status and measurement of body weight and height, blood pressure, should be performed if prolonged systemic glucocorticoid treatment is planned

Immediate :- Side effects include increased appetite, weight gain, mood/sleep disturbances , increased intra ocular pressures, hyperglycemia, tiredness . All of these can be monitored and managed with altering the timing and route of medications and encouraging physical activity .
A healthy diet ,avoidance of junk food and high salt food is important
Lastly reassurance regarding complete reversal on tapering is important

Long Term

At regular follow-ups monitoring body weight, linear growth, bone health, is recommended. Along with this monitoring of blood pressure, blood and/or urine glucose, and glaucoma/cataract at regular intervals is advisable.

Bone health monitoring includes evaluation of calcium and vitamin D intake, physical activity, back pain, and disease-related risk factors for bone loss such as chronic inflammation. Annual BMD measurement for screening osteoporosis should be performed in the follow-up of JIA patients on long-term glucocorticoid therapy. In children (4–17 years of age) treated with glucocorticoids for ≥ 3 months, it is recommended to optimize calcium intake (1000 mg/day) and vitamin D intake (600 IU/day) and lifestyle modifications (balanced diet, regular exercise, etc.)

Specific infections due to long term immunosuppression should be addressed accordingly.
Vaccinations including special situation vaccines like pneumococcal/meningococcal/ influenza should be offered in addition to completing regular vaccination (as per standard recommendations)

Lastly cosmetic issues like ‘striae’ / ‘Cushingoid’ appearance needs to be addressed with periodic counselling specially in adolescents who are on long term steroids to ensure compliance.

NEXT COMING- “H” for HLA B27 /B5/51

Suggested reading

Batu ED. Glucocorticoid treatment in juvenile idiopathic arthritis. Rheumatol Int. 2019 Jan;39(1):13-27

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Funk RS, Balevic S, Cooper JC Therapeutics: Nonbiologics In: Petty RE, Laxer RM, Lindsley CB, Wedderburn LR, editors. *Textbook of Pediatric Rheumatology*. 8th ed. Philadelphia: Elsevier; 2021:167–171

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