ABSTRACT: Intravenous supra-pharmacological doses of corticosteroids are used in various inflammatory and autoimmune conditions because they are cumulatively less toxic than sustained steroid treatment at lower quantitative dosage. Intravenous pulse therapy with corticosteroid involves administration of high doses (starting from 1 g/day), given on three or more consecutive days. Therapy is associated with significant side effects including worsening of hypertension, infections, dyselectrolytemia and behavioral effects. Because of possible adverse effects, it is recommended that patients stay at hospital during administration of pulse therapy. Uniform nursing care is necessary considering the responsibility of the nursing team regarding drug administration and follow-up of patients.

KEY WORDS: Corticosteroid, Hypertension, Dyselectrolytemia
INDICATION

There is considerable experience reported in the field of pediatric nephrology, particularly in nephrotic syndrome, renal allograft rejection, lupus nephritis and crescentic glomerulonephritis; other uses have included Kawasaki disease and Henoch Schonlein purpura. Dermatologists have successfully used this therapy in skin diseases like pemphigus, Reiter's disease and pyoderma gangrenosum.

COMMONLY USED IN

1. Rheumatoid arthritis
2. Juvenile rheumatoid arthritis
3. Systemic lupus erythematosus
4. Polymyositis
5. Severe forms of vasculitis
6. Steroid resistant nephritic syndrome
7. Crescentic glomerulonephritis
8. Acute allograft rejection
9. Pemphigus vulgaris
10. Bullous dermatitis herpetiformis

INFREQUENTLY USED IN

1. Psoriatic arthritis
2. Ankylosing spondylitis
3. Kawasaki disease
4. Lupus nephritis
5. Severe stevens-johnson syndrome
6. Myasthenia gravis
7. Severe ulcerative colitis
8. Exfoliative dermatitis

SYSTEMIC LUPUS ERYTHEMATOSIS

Therapy in patients with severe lupus nephritis (including WHO class III, IV, III+V, or IV+V) and severe acute non-renal disease, e.g. acute hemolytic anemia, uveitis, pericarditis or CNS lupus, comprises methylprednisolone pulses for three to five days, followed by six monthly pulses of cyclophosphamide (CP) along with oral prednisone at 1.5 mg/kg per day. However, a recent retrospective study conducted in adults questions the need of administration of high doses of methylprednisolone in treating SLE flares; here, administration of lower doses of methylprednisolone (total dose 1-1.5 g in three days) showed similar efficacy and was associated with decreased risk of infections when compared to standard higher doses (3 g in three days).

ACUTE RENAL ALLOGRAFT REJECTION

In the setting of acute renal allograft dysfunction when a diagnosis of acute rejection is made (graft biopsy suggestive of acute rejection Banff 1A / Banff 1B), methylprednisolone is administered intravenously at 10-15 mg/kg daily for 5 days followed by oral prednisolone daily at 2 mg/kg which is subsequently tapered; concomitant immunosuppression (tacrolimus/ cyclosporine/ azathioprine/ mycophenolate mofetil) is often increased.

JUVENILE RHEUMATOID ARTHRITIS

Rheumatoid arthritis (RA) is characterized by chronic synovial inflammation, with invasion of the synovial membrane by leucocytes, induced and maintained by inflammatory cytokines. Corticosteroids have been used in the treatment of RA since 1949. In patients with juvenile rheumatoid arthritis, pulsed administration of steroids is often used, especially in refractory cases with serious systemic features. It is often used to cause rapid improvement while simultaneously adding a slower acting disease modifying drug, i.e., as “bridge” therapy while awaiting the effects of the latter drug. Three pulses are given daily or on alternate days, or monthly pulses are administered, while adding alternate day oral prednisolone at 1-2 mg/ kg and nonsteroidal antiinflammatory agents.

MULTIPLE SCLEROSIS (MS)

Methylprednisolone has an important role particularly in the acute phase of the disease. High doses of intravenous methylprednisolone have been shown to be effective in reducing the number of MRI contrast-enhanced lesions at 30 and 60 days, mainly by decreasing the rate of new lesion formation.

PEMPHIGUS

Systemic corticosteroids are the most useful drugs for the treatment of PV, first used for this purpose by Thorn et al and popularized by Costello et al and Lever and White. Dexamethasone cyclophosphamide pulse (DCP) therapy is used for treatment of pemphigus in adults. In 1982, Pasricha et al treated five patients suffering from PV with an arbitrarily designed regimen. The regimen consisted of giving 100 mg dexamethasone in 500 mL of 5% glucose by a slow intravenous infusion on three consecutive days, along with 500 mg cyclophosphamide on one day only. Such dexamethasone-cyclophosphamide pulses (DCP) were given once a month and in between these pulses the patients received only 50 mg cyclophosphamide orally per day. After having received a total of 14 to 48 DCPs, further treatment for PV was withdrawn. All the patients were in continuous clinical remission for 4 to 9 years.

CONTRAINDICATION

Systemic infections, including fungal sepsis and uncontrolled hypertension are contraindications to initiation of pulse steroid therapy. The therapy is also contraindicated in patients with known hypersensitivity to the steroid preparation.

ADVERSE EFFECTS

Intravenous pulse steroids have been associated with potentially serious complications. Mild hypotension was known to occur in normotensive children in days when relatively rapid infusions were used. Some studies showed that adverse reactions occur during corticosteroid pulse therapy, such as skin rash, transient sleep disorder, mood...
swings, sinus bradycardia, hyperglycemia, high blood pressure, all of them mostly transient. The overall incidence of side effects with intravenous pulse therapy may exceed 50%.

CARDIOVASCULAR DISORDERS

A literature review shows that cardiovascular disorders may occur during corticosteroid pulse therapy. Some factors, such as age, heart failure, smoking, diabetes mellitus, high blood pressure, female gender, left ventricular hypertrophy, myocardial infarction, lung diseases and hyperthyroidism, may increase the risk of patients presenting cardiovascular changes during pulse therapy with corticosteroids. Sudden death, cardiac arrhythmias, circulatory collapse and cardiac arrest have been reported occasionally, usually following rapid administration of large doses of methylprednisolone (>500 mg administered over <10 minutes).

BLOOD GLUCOSE ABNORMALITIES

Corticosteroid therapy is associated with increased risk of hyperglycemia in patients with no previous diagnosis of diabetes mellitus, as well as with worsening and difficult control in those who suffer from this disease. The incidence of hyperglycemia rises if patients present risk factors associated to development of diabetes mellitus, such as age ≥ 45 years, body mass index (BMI) ≥ 25 kg/m², family history of diabetes mellitus, sedentary lifestyle, ethnicity, insulin resistance, history of gestational diabetes mellitus, hypertension, elevated HDL and triglyceride levels, polycystic ovary, and association of drugs that lead to blood glucose abnormalities, such as corticosteroids.

CONCLUSION

Pulses of high doses of corticosteroids have a significant but transient anti-inflammatory effect. Since it has been inferred that the most side effects of steroids are due to the long-term usage of intermediate to high doses of oral steroids, using the pulse therapy method can probably reduce the incidence of oral steroids side-effects in long-term. More information is needed to define the specific diseases to be treated, the optimal steroid to be used, and the optimal timing of pulses to avoid chronic toxicity and obtain maximum benefit.

REFERENCES


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