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Review article

A Review on Autoimmune Disorder and Overview of Myositis

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ABSTRACT:

Myositis is an autoimmune disease that is a rare group of diseases characterized by inflamed muscle , which can cause long-term muscle fatigue and muscle weakness. It is also called idiopathic inflammatory myopathy (IIM). The group of muscle diseases is called myopathy and they are classified as dermatomyositis (DM), polymyositis (PM), inclusion body myositis(IBM), focal myositis, juvenile dermatomyositis(JDM), amyopathic dermatomyositis. A woman is more susceptible to this auto immune disease compared to a man. The reason factors such as the immune system accidentally causes muscle tissue muscle weakness. In the flesh inflammation is caused by white blood cells. The penetrate the immune cells of the bone muscle forms macrophages, dendrites cells (myeloid and plasmacytoid), T cells(Th1,Th2and Th17, Tregs). Muscle biopsy which is used to detect inflammation and degeneration mechanism. Muscle MRI is also used to assess the lower extremities and pelvis Zone. Glucocorticoids are the first line treatment IIMs, Methotrexate (MTX) with Azathioprine is considered as first choice therapeutic immunotherapy agents muscle participation in IIM. In this article we will give information about its Epidemiology, etiology, Clinical presentation, types, and their pathology and for the treatment of myositis.

Keywords: inflammatory myopathy, dermatomyositis, polymyositis, juvenile dermatomyositis.

1. INTRODUCTION

The term “myositis” refers to generalized occurrence of muscular swelling andsourness. This is the condition that cause muscle weakness and pain include infection, muscle injury from medication, inherited disease, electrolyte imbalance and thyroid disease. It indicates a disease involving chronic inflammation of muscle of occurring together with other symptoms. This condition also called as idiopathic inflammatory myopathies (IIM).

Inflammatory myopathies are auto immune diseases which refers to body immune system which normally fights infection and viruses directed and begins to attack by bodies own normal healthy tissue [1]. They comprise group of acquired myopathies where muscle weakness and inflammatory infiltrates are the principleClinical and histological finding. Other organ systems often involved are skin, cardiac, GI, and Pulmonary system [2].

EPIDEMOLOGY

The Promising advancements have been made in the last 10 years in the identification of myositis specific antibodies (MSA), which have a 95% specificity but a 20% sensitivity in the diagnosis of IIM [3]. The incidence of polymyositis and dermatomyositis is estimated to be between 1.2 and 19 million people at risk annually, and the prevalence ranges from 5 to 22 per 100,000 people. Because the detection rate is rising, myositis is becoming more common over time. Male predominance is 3:1 and female predominance is 2:1 in dermatomyositis, which has bimodal incidence that peaks in youth and again in the 50-70 age range [4].

TYPES

→ **Dermatomyositis:**

Dermatomyositis is a medical condition that causes muscle weakness and rashes. Women are more prone when compared to men. There is no cure for this condition [5].

Etiology:

a. Genetic factors :

The patients with human Leukocyte antigen (HLA) types are higher risk Dermatomyositis[6].

b. Immunological factors

c. Environmental factors

- ✓ Infections Such as Coxsackie B virus, enterovirus, and Paro virus Drugs.
- ✓ Drugs such as Anti neoplastic drugs, Anti infectious agents, non-steroidal anti- inflammatory drugs[7]

Symptoms:

- → Gottron’s papules on the outside of hands and fingers
- → Calcium deposits under the skin
- → Swelling around the eyes
- → Purple -red rashes

Pathology:

The disease involves immune complexes attaching to endothelial cells, which then triggers complement system activation and cell lysis that is carried out by the membrane attack complex (MAC) [8].

Which leads to necrosis of these cells, and a reduced number of capillaries in muscle can be seen. The Blood supply becomes insufficient, which peri-fascicular atrophy.

→ **Polymyositis:**

An autoimmune and chronic inflammatory myopathy, is characterized by symmetrical proximal muscle weakness due to involvement of endomysial layers of skeletal muscle, which involves the perimysial layers of muscle along with dermatological presentation [9].

Etiology:

To abnormal activation of cytotoxic T lymphocytes (CD8 Cells) and macrophages against muscular antigens as well as strong extrafusal muscular expression of major histocompatibility complex I[10] causing damage to endomysium of skeletal muscles.

Symptoms:

The symptoms include Dysphasia, Joint pain, Fatigue, Shortness of breath, Heart arrythmias.

Pathology:

The proinflammatory milieu includes expression of cytokinin's such as IFN-γ , IL-6, IL-1β, tumor necrosis factor (TNF)-α and TGF-β[11] and chemokines such as IL-8, CCL-2, CCL-3, CCL-4, CCL-5, CCL-9, CXCL-10, Contributing to local inflammation and attracting stimulus to immune cells.

→ **Necrotizing myopathy:**

This is heterogenous and includes autoimmune inflammatory mechanisms, para neoplastic conditions and exposure to toxins or drugs. Myositis specific auto- antibodies against single recognition particle (SRP) or 3-hydroxy-3-methyl glutaryl co Enzyme A reductase (HMGCR) can be detected in a subset of 4-6% of patients with myositis and 60% of patients with NM [12].

→ **Inclusion body myositis:**

IBM is a sporadic muscle disease of aging and this is the most affected to the age group of 40 years. It develops slowly, progressively, and painlessly leading to mainly asymmetric paresis [13]. The flexation of hands and fingers and knee extension are typically affected. The development of dysphagia is typical for IBM, and difficulty swallowing are observed in 65-80%.

Clinical Presentation:

→ Trouble swallowing

→ Decrease in reflux response

→ Nerve damage

→ **Focal Myositis:**

Focal myositis is termed as an isolated inflammatory pseudotumor usually restricted to one skeletal muscle[14].

Clinical presentation:

Rapidly growing solitary mass within the lower limbs.

Pathology:

These are circumscribed within one muscle and include marked heterogeneity of fiber sizes include hypertrophic, regenerating fibers, inflammatory infiltrates mainly composed of macrophages and T cells [15] and fibrosis.

→ **Juvenile dermatomyositis:**

Juvenile dermatomyositis is the most common idiopathic inflammatory myopathies (IIM) in children. It is systematic capillary vasculopathy [16].

Clinical presentation:

Proximal muscle weakness, raised muscle enzymes and pathognomic skin rashes such as heliotrope rash, gottron's papules.

Pathology:

An inflammatory cascade with type-1 interferon response leads to over expression of major histo compatibility complex (MHC) class I regulates adhesion molecules that influences migration of lymphocyte leading to inflammatory infiltration of muscle [17].

→ **Amyopathic dermatomyositis:**

This is a rare idiopathic, connective tissue disease that present with dermatologic lesions of classic dermatomyositis but lacks the myopathy of that disease. This term refers to patients after 2 years of biopsy confirm classic cutaneous manifestations of dermatomyositis. A risk of developing interstitial lung disease [18] or malignancy in patients with amyopathic dermatomyositis.

DIAGNOSIS

The test which are used to confirm diagnosis are Auto antibodies, muscle imaging, electro physiologic

Examination and muscle biopsy. Autoantibodies are present with more than 80% patients with inflammatory myositis [19]. Those antibodies are classified as:

→ Myositis-specific antibodies

→ Myositis-associated antibodies

→ **Muscle Biopsy:**

The best way to diagnose the myositis and distinguish from other muscle disorders. For detecting the disease condition, a piece of muscle tissue and study for abnormalities [20].

→ **Electromyography (EMG):**

To assess muscle dysfunction [22].

→ **Nerve conduction studies:**

To measure nerves health & electric shock are directly administered to skin overlying the nerves [23].

→ **Cystolic 5'-NucleotidaseAntibodies:**

The antibodies against cytosolic 5'-nucleotidase 1A(Cn-1A) are the only available serum diagnostic test for inclusion body myositis.

→ **Muscle MRI**:

Anon-invasive & safe technique for muscle exploration, allows muscle morphology &analysis.

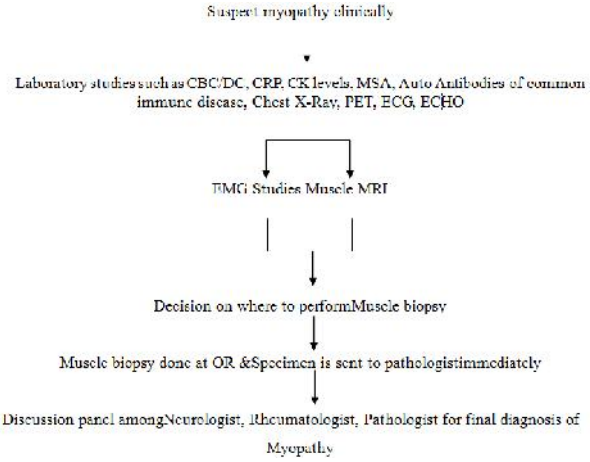
→ **Other tests:**

✓ **Aldolase**:

To identify weakness caused by muscular problems in myositis.

- ✓ **Anti-nuclear Antibodies**:
  To determine the autoimmune diseases. When the protecting system turns towards fighting body's own tissue, an auto immune disease is present and the ANA test will be positive
- ✓ **Creatine Kinase**:
  This is a type of protein called an enzyme that especially active in skeletal muscle. When the muscle tissue is damaged the cells release their contents in blood stream causing elevated CK levels in blood.
- ✓ **Sedimentation rate:**
  To measure swelling& inflammation

DIAGNOSTIC APPROACH [24]



2. MANAGEMENT

Pharmacological treatment [25]

The pharmacological treatment for myositisis

- Glucocorticoids,
- Adrenocorticotropic,
- Hydroxychloroquine
- Methotrexate,
- Azathioprine,
- Calcineurin inhibitors,
- Mycophenolate mofetil,
- Cyclophosphamide,
- intravenousimmunoglobulin,
- Rituximab

AZATHIOPRIN:

Dose/Administration:

2-3mg/Kg; daily oral dose in morning

Side effects:pancreatitis, teratogenicity

CYCLOPHOSPHAMIDE:

Dose/Administration:

1.5-2mg/Kg; daily oral dose in morning or 0.5-1.0g/m^2; monthly IV Infusion every 4-8 weeks as needed.

Side effects:

Bone marrow suppression, Infertility

CYCLOSPORIN:

Dose/Administration:

2-3mg/Kg; twice daily oral dose

Side effects: Hypertension, Tremor

INTRAVENOUS IMMUNOGLOBULIN:

Dose/Administration:

2g/Kg; IV infusion over 2-5 days than 1g/Kg; IV infusion every 4-8 weeks as needed.

Side effects: Arrhythmias, Stroke.

METHYL PREDNISOLONE:

Dose/Administration:

1g in 100mL normal Saline; IV infusion over 1-2 hours, daily or every other day for 3-6 doses.

Side effects: Anxiety, Insomnia

MYCOPHENOLATE MOFETIL:

Dose/Administration:

Adults 1-2g, children:1,200mg/m^2; oral in 2 divideddoses daily maximum 1g/dayin kidney failure[29].

Side effects: Amblyopia,neoplasia

PREDNISONE:

Dose/Administration:

Initiate at 0.75 to 1.5mg/Kg;Oral daily dose

RITUXIMAB:

Dose/Administration:

750mg/m^2 to maximum of 1g: IV infusion repeated in 2weeks. Typically repeated every 6-18 months

Side effects:

Infusion reactions, infection

TACROLIMUS:

Dose/Administration:

0.1-0.2 mg/Kg; in 2 dividedoral doses daily.

Side effects:

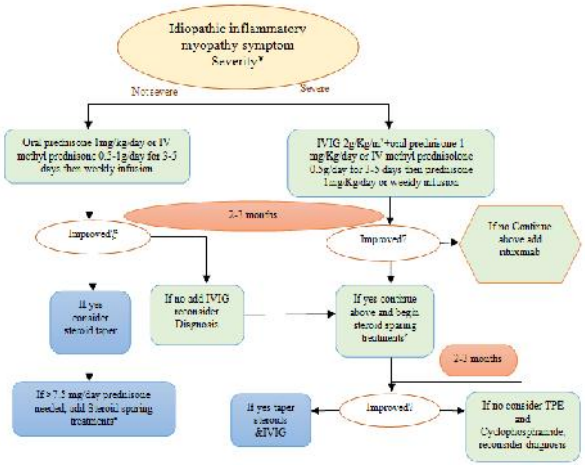
Gum hyperplasia, hirsuitism

Non pharmacological treatment:

- → Physical therapy
- → Exercise
- → Rest

Nutrition and Reduction of stress

TREATMENT ALGORITHM



a. Non ambulatory, anti SRP^{+}, or ICI- associated IMNM or anti MDA-5^{+} ILD may require hospitalization & aggressive immunosuppression

b. Response to treatment must include objective improvement in skin rashes, muscle strength& function & not CK level.

c. Methotrexate, azathioprine, or mycophenolate mofetil**.**

3. CONCLUSION

Myositis is an autoimmune disorder which is rare group of disease, this cause prolonged muscle fatigue. The genetic and environmental risk factors increase the risk of occurring. The muscle biopsy and the muscle MRI are the most common diagnostic parameters. The only way to treat it and keep symptoms low is with the lifestyle.

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