Juvenile Dermatomyositis

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CASE SUMMARY

History

An 18-month-old baby girl, born in Shenzhen and came to Hong Kong when she was 9 months old was well all along. In early October 1999, she developed recurrent low-grade fever associated with poor appetite. A rash also developed on her face and dorsa of hand, which was diagnosed as "skin allergy" by a general practitioner. Despite topical treatment, the rash failed to resolve and her eyes became puffy. Her mother also noticed that her baby was unwilling to stand or walk and was getting irritable when hugged or touched. In November 1999, she presented to Accident and Emergency Department when she developed persistent fever (>103F) and a deteriorating cough.

Physical Examination

She was an ill-looking child with low-grade fever. She was floppy and there were marked muscle weakness (proximal power 2/5 & distal power 3/5). There were periorbital symmetrical violaceous hue (Figure 1) and Gottron's papules at the proximal interphalangeal joints of both hands (Figure 2). Symmetrical non-blanchable papulosquamous erythema was also noted at her thighs (Figure 3) and her limbs were tender and swollen. There were no dilated nail fold capillaries.

Investigations

Blood results showed ESR 116, CRP 14, CK 2802 (NR 2-134), LDH 2162 (NR 390-699), ANA=1:40 and negative anti-Jo-1, anti-Ro, anti-La, anti-RNP, anti-Sm, anti-dsDNA, RhF and ANCA. RFT, C3/C4, IgA & IgG levels were normal. Skin biopsy from left thigh showed patchy parakeratosis, basal layer spongiosis in epidermis and peri-capillary lymphocytic infiltrate in the superficial dermis. The impression was interface dermatitis, compatible with dermatomyositis. Muscle biopsy at left thigh showed non-specific myopathic changes with scattered atrophic type I and II fibres.

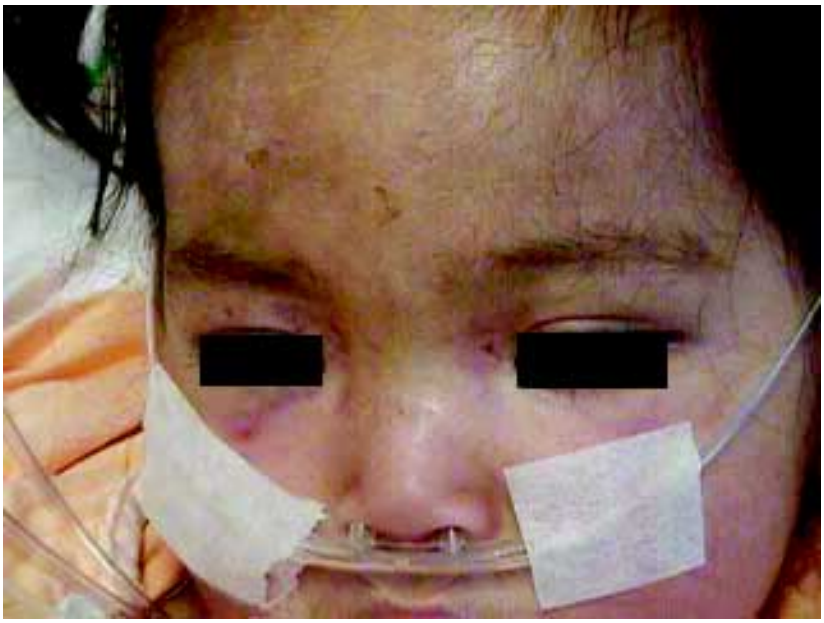

Figure 1: Symmetrical periorbital violaceous hue

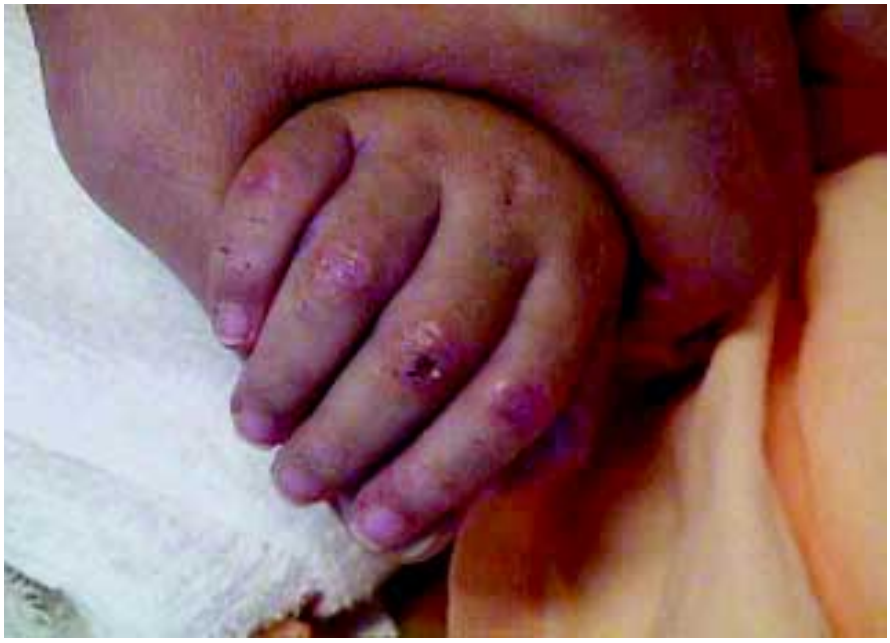

Figure 2: Gottron's papules at proximal interphalangeal joints

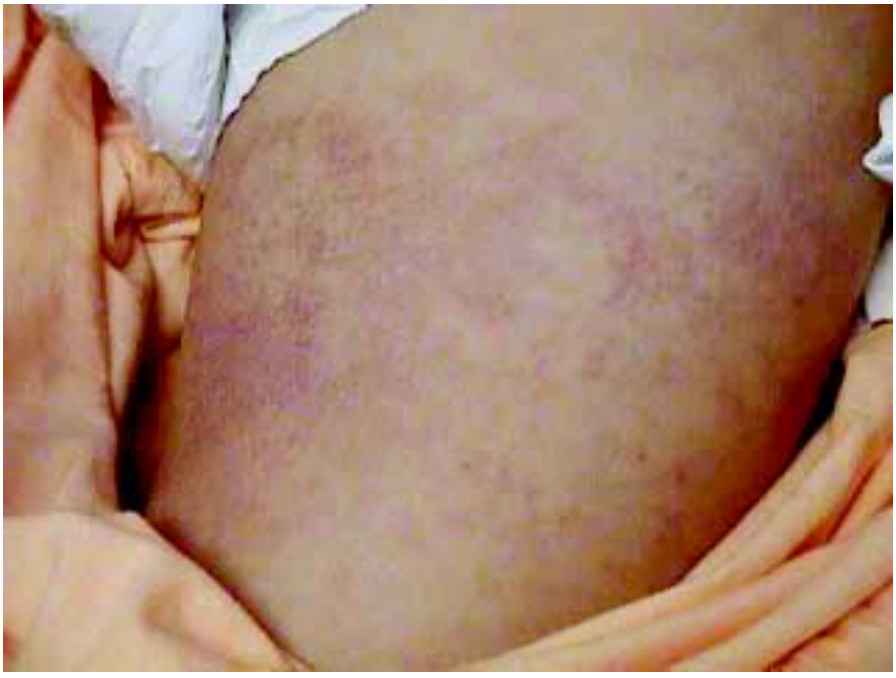

Figure 3: Symmetrical non-blanchable papulosquamous erythema at thigh

Electromyography was canceled due to clinical deterioration. Echocardiography and Tropinin I assay were normal.

Differential diagnosis

These include juvenile dermatomyositis, post-viral myositis (usually presents with exanthem and transient muscle weakness only), primary myopathies (usually do not have characteristic rash) and inflammatory myositis with other connective tissue diseases.

Diagnosis

The clinical and laboratory findings satisfied 2 out of 4 of the criteria for diagnosis of dermatomyositis

(Table 1).[1] The diagnosis of probable juvenile dermatomyositis was made.

Treatment and course

Prednisolone 2 mg/kg/day was started leading to prompt improvement of muscle power and fall in muscle enzymes. This was complicated by cytomegalovirus and parainfluenza virus type I pneumonitis. Subsequently, fulminant pseudomonas pneumonia and acute respiratory distress syndrome (ARDS) developed. Ventilation was required in mid-December, 1999. In view of fulminant chest infection complicating dermatomyositis, six courses of intravenous immunoglobulin were given weekly from late December till February. In March 2000, her power improved to 4/5 proximally and CK & LDH were normal. Prednisolone was reduced to 0.5 mg/kg/day alternate days. Skin rash resolved with pigmentation. However, attempts to wean off mechanical ventilation failed. There were significant lung parenchyma damage from fulminant chest infection and ARDS, and a tracheostomy was required. Despite multiple broad-spectrum systemic antibiotics, the patient succumbed in April 2000 from severe pneumonia.

REVIEW ON JUVENILE DERMATOMYOSITIS

Definition and epidemiology

Juvenile Dermatomyositis (JDM) is a rare inflammatory myopathy with characteristic skin manifestations and muscular weakness. It is the commonest idiopathic inflammatory myopathies of childhood.[2] The incidence has been reported to be 3.2 per million populations with disease onset usually occurring between 5 and 14 years of age. Although the sexes are affected equally in the first decade of life, there is a female predominance thereafter.[3] It is exceptional for JDM to occur in infancy as in this patient.

Aetiology

The microvasculature appears to be the primary site of pathology in JDM. The aetiology of this small vessel injury is poorly understood, but possible causes include immune complex deposition, activation of terminal complement components, cytotoxic factors released from mononuclear cells, organ specific autoantibodies and infectious agents, especially enteroviruses.[3] Myositis specific antibodies (MSA), seen in 1/3 cases, targets cytoplasmic proteins and RNA in protein synthesis.[4] Its level precedes myositis and correlates with disease activity. Anti-Mi-2, one of MSA, is highly specific for dermatomyositis. Genetics may also contribute to development of JDM. Patients are found to have a strong association with HLA antigens B8/DR3.[2]

Clinical presentation[3,4]

While adult dermatomyositis and JDM share most of the diagnostic skin features, JDM is associated with high incidence of calcinosis cutis, but not with underlying malignancy. It also has more features of vasculopathy.

The skin rash is usually of insidious onset and may precede myositis up to a year or more. However myositis occasionally precede skin rash by months instead; or alternatively the patient first presents with malaise and low-grade fever. Symmetrical proximal muscle weakness may present as fatigability with daily activities and at late stage may demonstrate Gower's sign. Muscle tenderness with or without anorexia may occur. Ten percent of cases also have dysphagia, dysphonia and dysponea suggesting oesophageal, palatal or pulmonary involvements.

Seventy percent of children develop the diagnostic rash with heliotropic periorbital macular erythema with or without oedema, Gottron's papules or patches, periungal erythema, confluent violaceous macular erythema at extensors of elbows, knees, upper trunk and atrophy. Some may have fibrosis and hypo- or

Table 1. Bohan and Peter Criteria for Diagnosis of Dermatomyositis (DM)[1]

Must have characteristic rash and:

1) Proximal symmetric muscle weakness
2) Muscle biopsy evidence of an inflammatory myopathy
3) Elevation of serum muscle enzymes
4) Electromyographic features of a myopathy

Definite DM:	fulfill 3 out of 4 criteria
Probable DM:	fulfill 2 out of 4 criteria
Possible DM:	fulfill 1 out of 4 criteria

hyperpigmentation. Erythematous poikiloderma occurs late and one third of cases have photosensitivity. Rarely, hypertrichosis, and partial lipodystrophy may be seen in JDM (not seen in adults). Typically, the skin rash is independent of the severity of myositis. Other associated features include dystrophic calcification (normal serum calcium and phosphate). This is seen in 30-70% of cases, usually in one to three years of diagnosis. Calcification is probably due to necrosis and scarring of the involved tissues. Sites of predilection include knees, elbows and buttock. The four clinical patterns of calcification described were subcutaneous, superficial, intramuscular and exoskeletal. Painful ulceration of calcified nodules, recurrent cellulitis and contractures may ensue. Other manifestations include symmetrical arthritis of large and small joints, gastrointestinal vasculitis, myocarditis, and interstitial pulmonary fibrosis. One quarter of cases have features of other connective tissue diseases. While patients may present with the characteristic rash alone, juvenile amyotrophic dermatomyositis is rare.

Diagnosis

This is based on Bohan and Peter Criteria.[1] Diagnosis is often delayed. The rash may be missed or misdiagnosed especially in pigmented skin. Muscle weakness may be misinterpreted as laziness and is difficult to demonstrate clinically if the child is uncooperative. Muscle enzymes are often normal at onset. Muscle biopsy and electromyography (EMG) may fail to show focal myopathy unless the involved muscle is investigated. As a result, the use of magnetic resonance imaging MRI (fat suppression sequence) has become increasingly important. It facilitates detection of focal inflammatory myopathy and directs the selection of a site of active inflammation for EMG and muscle biopsy.[2] One must remember, that MRI is sensitive but non-specific and non-diagnostic as prolonged muscle cramp, local trauma, strenuous exercise can give similar picture to inflammatory myopathies. Delay in therapy is strongly associated with an increased incidence of calcinosis.

Serologically, ANA is positive in 23% cases. Anti PM-1 and anti-Jo-1 are associated with interstitial pulmonary fibrosis and anti-Mi 2 with myositis.[3]

Skin biopsy classically shows perivascular lymphocytic infiltrate, basal keratinocyte vacuolization, mucin deposit and epidermal atrophy indistinguishable from that of lupus erythematosus. In immunoflorescence study, C5b-9 complement deposition is seen in dermal vasculature and dermoepidermal junction of dermatomyositis but not in systemic lupus erythematosus.[4]

Management and prognosis

Prompt diagnosis and early aggressive treatment best prevents complications. Disease flare can be detected with symptoms, raised LDH and AST. Corticosteroid (1-2 mg/kg/day) is the first line treatment. Pulse intravenous methylprednisolone is reserved in severe cases. Hydroxychloroquine (2-5 mg/kg/day) may help the rash but it does not reduce the need for systemic steroid. Other agents that have been used include methotrexate, azathioprine and low dose cyclosporin A. Intravenous Immunoglobulin has shown encouraging but inconsistent results. Aggressive treatment is usually not appropriate for children with skin signs but no active myositis.[3]

Physical therapy is crucial to prevent contractures and disuse muscle atrophy. Calcinosis cutis is difficult to be treated but there were reports of improvement with diltiazem, warfarin and colchicine. Surgery is required for severe contractures.[4]

Poor indicators of disease include initial treatment with low dose prednisolone, late onset of treatment, recalcitrant disease and pharyngeal involvement. Two thirds of children have severe complications from calcinosis and the mortality rate in United States is 3%.[4]

Learning points:

Early diagnosis and aggressive treatment of JDM best prevent complications, as delay in therapy is strongly associated with an increased incidence of calcinosis.

References

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