POLYMYOSITIS

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PREFACE

THE unique position of progressive muscular dystrophy as the prototype of a primary disorder of muscle has been challenged in recent years by a number of new diseases. These have been introduced to the medical profession under a variety of terms such as dermatomyositis, polymyositis, neuromyositis, paroxysmal and sporadic myohemoglobinuria, interstitial polymyositis with 'collagen' diseases (rheumatoid arthritis, disseminated lupus erythematosus and scleroderma), generalised myositis fibrosa, generalised myositis ossificans, calcinosis universalis, necropsial muscular dystrophy, 'myasthenic myopathy', 'late-life' muscular dystrophy and carcinomatous myopathy. It seems probable that these many diseases did not emerge from obscurity to afflict the human race for the first time in the twentieth century but rather that they have only lately been differentiated from other neuromuscular disorders. Their identification has been achieved by assiduous clinical study, assisted by the more frequent use of special laboratory procedures such as muscle biopsy and electromyography.

A voluminous medical literature has accumulated concerning each of these clinical entities but, unfortunately, it has done little to aid us in our understanding of them or in clarifying their relationships one to another. Moreover, the terminology has also remained a source of confusion for at some time or other nearly all of them have been designated as polymyositis, with the implication, often quite erroneous as we shall see, that they are all due to an infection or an inflammatory process. Part of the difficulty has unquestionably arisen from the fact that the number of recorded cases of some of these conditions is few; and some of the descriptions of clinical and pathological data have been so meagre and imprecise that it cannot be determined whether they all represent separate diseases or simply several variants of a few basic disorders of muscle.

It is with the object of analysing critically some of these problems against the background of a personal experience with a series of forty cases, collected from two large general hospitals in the north-eastern United States and north-east England, that we present the present monograph. Clinically all of our cases showed, at some stage of the illness, unmistakable symptoms and signs of a generalised disease of muscle with weakness and atrophy. Pathologically, all cases in which muscle sections were obtained at biopsy or autopsy
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revealed a degenerative and often an inflammatory process of a type and degree which, in combination with the clinical picture, set them apart from progressive muscular dystrophy. The applicability of the term "polymyositis" in the denomination of such a varied group of cases will be considered in Chapter 10. It should be stressed that cases of unequivocally infective (bacterial or virus) myositis were excluded and that we are considering the "idiopathic" disease.

The text of the present communication will begin with a synopsis and critical review of published reports concerning each of the muscle disorders under consideration, in order to orientate the reader in this confusing field. This will be followed by a detailed analysis of the clinical and pathological findings in our own cases which are reported individually in the Appendix. Finally, we shall attempt to make certain deductions concerning the nature of the morbid process or processes involved and to draw certain conclusions as to their inter-relationship.

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CHAPTER 1

POLYMYOSITIS AND RELATED CONDITIONS: A CRITICAL REVIEW OF PRESENT KNOWLEDGE

DERMATOMYOSITIS AND POLYMYOSITIS

Introduction

It is generally acknowledged that the first recorded case of this type was that described by Wagner (1863) who introduced the term ‘polymyositis’. He reported an acute generalised muscular affection, with skin involvement, which progressed rapidly to a fatal outcome within six days. In a similar case described by Potain (1875) the illness was less acute, but the patient died from bronchopneumonia between four and five months after the onset. A further report by Wagner appeared in 1887, while, in the same year, Hepp presented a full account of the clinical features of a similar disorder under the name of pseudotrichinosis, and Jackson, a Boston physician, contributed a case report, the first from the United States, under the title ‘myositis universalis acuta infectiosa’. In Hepp's case there were no skin lesions, the picture being that of a subacute polymyositis, but Unverricht (1887) stressed the almost invariable occurrence of lesions in the skin as well as in the muscles and coined the name ‘dermatomyositis’. Subsequently, the same author (Unverricht, 1891) described the pattern of muscular involvement, noting the characteristic affection of trunk and proximal limb muscles, but appreciating that virtually any striated muscle in the body could be involved. He also delineated the clinical course of the disease, pointing out that not all cases were fatal; one of his patients with an acute, severe form of the disease made a complete recovery. From these and numerous other reports, particularly in the French and German literature, the clinical and pathological features of these conditions were gradually defined and were
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distinguished from those of bacterial and parasitic myositis. In 1899 and in 1903 Oppenheim drew attention to the occasional involvement of mucous membranes and of ocular and cardiac muscle and pointed out that the skin lesions might be scleroderma-tous in character. A chronic form of the disease was described by Petes and Cléjat in 1906 and they stressed the extreme degree of atrophy and sclerosis of the skin (poikiloderma) which could eventually develop.

Gowers (1899) and Batten (1909), who were the first to report cases from Great Britain, used the title "polymyositis" for the disease, despite the fact that they described changes in both skin and muscle. Subsequently, most of the published accounts have reflected an uncertainty as to the relationship between dermatomyositis and other acute and chronic muscle diseases without skin lesions. The terms polymyositis and dermatomyositis were used almost indiscriminately by the early authors and it was more or less assumed that skin changes were an integral part of the disease. This view has remained current up to the present day and until the last few years there has been scanty recognition of the fact that a condition of this nature may occur without recognisable changes in the skin. A comparison of cases of dermatomyositis and polymyositis reported more recently will underline this fact. There is ample evidence that the presence or absence of skin lesions does not depend upon etiology, nor does it appear to be related to the pattern of pathological changes in the muscle. These questions will be considered in detail in subsequent chapters.

Dermatomyositis

Steiner, in 1903, reported a case from the Johns Hopkins Hospital under the name "dermatomyositis", even though skin changes were minimal; he also reviewed the twenty-eight cases which had been published up to that time. His admirable description of the clinical picture and his definition of dermatomyositis as an acute, subacute or chronic disease of unknown origin characterised by oedema, dermatitis and multiple muscle inflammation, could hardly be improved upon today, so far as the commonly accepted picture of dermatomyositis is concerned. However, in common with many authors writing subsequently, he failed to recognise that other cases occurred with identical muscle changes but without skin lesions, pain, tenderness or constitutional symptoms. That this limited concept of the disease is retained today may readily be verified by reference to the many reviews which have been written upon this subject. Karellitz and Welt (1932) collected seventy-five cases from the literature, while Schuermann, in 1939, was able to review two hundred and sixty-three cases, of which forty-seven were in children. O'Leary and Waisman (1940) described forty personal cases and Selander (1950) reviewed twenty-two occurring in childhood, of which three were personal, while Sheard (1951) reported twenty-five cases and Wedgwood et al. (1953) another twenty-six, all children, and seen between 1916 and 1952. Each of these authors referred to very occasional cases in which skin lesions were absent or minimal but laid no stress on this finding and the same omission is noted in the recent review by Domalski and Morgan (1955). Matthews and Burne (1953) pointed out that dermatomyositis could resemble polyneuritis, myasthenia gravis or bulbar palsy and that skin changes could be minimal; however, like Wilson (1954), they did not recognise that they could be absent and they went on to state that the resemblance to progressive muscular dystrophy could seldom be close. Ford (1952), too, while recognising that there may be no cutaneous involvement and that the condition might resemble a polyneuritis, failed to take account of that form of the disease which, by its chronicity and lack of skin lesions, shows many of the characters of a muscular dystrophy.

Apart from isolated reports which received little attention, only Keil (1940) remarked upon the resemblance between myositis and dystrophy, saying that some of his cases of dermatomyositis had been diagnosed as myopathies and that "Neurologists seem hardly to be familiar with this peculiar condition in its various and manifold phases". Recent reports (Adams et al., 1953; Eaton, 1954; van Bogaert et al., 1955; Garcia et al., 1955; Nattrass, 1954, 1956; Walton, 1956; Coer, 1956) have underlined the truth of this assertion and have stressed that the accepted concept of dermatomyositis is too rigidly defined. Not only are there subacute and chronic cases in which skin changes are minimal but an essentially similar condition without cutaneous manifestations is much more common than is generally realised.
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Polymyositis

The existence of an acute form of polymyositis in which there may be striking edema of the muscles and subcutaneous tissues but no recognisable lesion of the skin, has been recognised since Hepp’s report in 1887. The condition runs a course very like that of acute dermatomyositis and may occur at any age, though it seems to be most common in childhood. The case of ‘myotonia congenita’ described by Bovet in 1936 was a probable example of this condition occurring in an infant of three weeks. Two children afflicted by this form of the disease have been reported by Radermecker and van Bogaert (1955), and similar cases are referred to by Garcia et al. (1955). There seems to be no reason why acute hemorrhagic polymyositis (Maresco et al., 1934) should not be considered to be similar, as the hemorrhages in the muscles are simply an indication of the acuteness of the disease process. It is apparent that an acute polymyositis form of polyarteritis nodosa may present with this clinical picture (Radermecker and van Bogaert, 1952) but in this condition the histological changes are characteristic of the primary arterial disease and it is clear that not all cases of acute polymyositis are of this type, despite recent assertions to the contrary (Caldwell, 1957).

The acute form of polymyositis is, however, comparatively rare and it is now apparent that the disease more commonly presents in a sub-acute or chronic form with little or no constitutional upset, pain or muscular tenderness. It is these cases which may resemble very closely muscular dystrophy, myasthenia gravis or polyneuritis of proximal distribution. They are relatively common and it is certain that many have gone unrecognised in the past. As we shall point out, no fewer than fourteen of our forty cases had been diagnosed as examples of muscular dystrophy. Furthermore, it is probable that at least six of the eight cases studied by one of us (J.N.W.) with Nattrass (1954), in which recovery had taken place from an illness previously diagnosed by eminent clinicians as progressive muscular dystrophy, were suffering from polymyositis.

The first case in which this diagnostic error occurred was probably that of Cassirer (1898); and the general failure of clinicians and pathologists to recognise the entity of polymyositis

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and its mimicry of muscular dystrophy can probably be explained by the pauciety of subsequent reports of cases of this type. One of the first writers to discuss the differential diagnosis of dystrophy and polymyositis was Levison, who, in 1937, described two cases with involvement of proximal muscles, one of which was fatal owing to pharyngeal paralysis and oedema of the glottis. Subsequently, Urechia and Dragomir (1943) and Furtado and Alvim (1945) each described cases showing a striking clinical resemblance to progressive muscular dystrophy. These reports received little attention. In 1950, Christensen and Levison reported six personal cases of polymyositis, four adults and two children. Two of their cases (Nos. 4 and 5) experienced muscular weakness of rapid progression, and one of these recovered completely; two others (cases 1 and 5) showed some features (muscle pain, remittent course, dysphagia, apparent response to prostigmine) which are common in dermatomyositis, but yet had no skin involvement. The remaining two cases (Cases 2 and 3) had each developed a gradually progressive weakness of proximal limb muscles; they showed pseudohypertrophy of calf muscles and seemed clinically typical of progressive muscular dystrophy; the true diagnosis was only established following muscle biopsy. Although the descriptions of muscle pathology in this report are not as detailed as one would wish and the authors tend to give rise to confusion by inappropriate use of the word ‘dystrophy’, it is clear that infiltrations of inflammatory cells were a prominent feature of the pathological picture in all of these cases and there seems little doubt that the patients were suffering from polymyositis.

Adams et al. (1953) recently reviewed the pathological changes in dermatomyositis and polymyositis and stressed the methods of distinguishing these appearances from those of progressive muscular dystrophy. We now believe that the boundaries of the clinical syndrome of polymyositis presented in this work were too narrow. For instance, although the accepted clinical manifestations of dermatomyositis were described under the heading of acute polymyositis, sufficient emphasis was not placed upon those cases in which the skin changes may be minimal and easily missed. Furthermore, chronic polymyositis was depicted as an inexorably progressive condition affecting particularly the peripheral limb muscles.
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As we shall point out, we have not observed any case conforming with the latter description in the patients of the present series. The disease practically always began in the proximal limb muscles in our cases, although the distal muscles were sometimes affected simultaneously. Our recent experience has also led us to modify and extend certain of the pathological observations described by one of us (R. D. A.) in this work.

That the syndrome is gradually receiving more widespread recognition is evident from recent reviews. Zierler and Lilienthal (1953) described two cases, one of which could not be distinguished clinically from progressive muscular dystrophy save for the rapidity of progression of the disease. Eaton (1954) has also discussed the subject in considerable detail, and has underlined the usual absence of pain and constitutional upset and the frequency with which this condition has been called muscular dystrophy. He reported a series of forty-one cases, of which seventeen showed no cutaneous manifestations. In some of the remaining twenty-four the cutaneous manifestations were primary, in others they did not appear until muscular weakness had been present for a considerable time, while in eight cases they were minimal and could easily have been overlooked. The author suggested that these cases should continue to be called dermatomyositis, while the term polymyositis should be reserved for the remainder. In patients who had one of the other 'collagen' diseases along with muscle involvement he suggested that the diagnosis should be qualified as, say, 'polymyositis with rheumatoid arthritis'. The importance of electromyography and muscle biopsy in diagnosis was indicated, but it was also pointed out that sometimes the histological changes in the muscle were minimal, seeming insufficient to explain the comparative severity of the patient's symptoms. Despite this difficulty, the author felt that polymyositis gave a clinical picture sufficiently distinctive to be regarded as a definite clinical entity.

Additional support for this view has come from the reports of van Bogaert and Radermecker (1954), van Bogaert et al. (1955), Garcia et al. (1955), Richardson (1956) and Coërs (1956). Van Bogaert et al. have described in detail seven cases of chronic polymyositis in which the clinical picture was that of a myopathy of late onset, while Garcia et al., in an exhaustive review,
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to pressure palsies of peripheral nerves. Gowers (1899) believed that in his case there was polynéuritis as well as polymyositis, but his report gives no conclusive evidence of nerve involvement. Marinesco (1910), however, and numerous other workers writing subsequently, accepted the association, suggesting that the agent responsible for the muscular lesions could also affect the peripheral nerves. Nevertheless, in many instances the diagnosis of neuromyositis rested upon such inadequate evidence of nerve involvement as absence of tendon reflexes and tenderness of nerve trunks (e.g. Rosenthal and Hoffmann, 1923).

It is apparent that the great majority of writers in recent years (e.g. van Bogaert et al., 1955) have failed to discover clinical evidence of nerve involvement in cases of polymyositis. On the other hand, pathological and electrical studies have suggested that a syndrome of neuromyositis may exist (Garcin et al., 1955). In the fatal case of polymyositis described by Kinney and Mahler (1940) there was some loss of myelin in peripheral nerve trunks. Van Bogaert and Radermecker (1954) also mention a case in which there was chronic myxomatous evidence of a neuropathic lesion; they also describe endoneurial cellular infiltrates and patchy loss of myelin in terminal intramuscular nerves in cases of polymyositis, while mentioning that the main nerve trunks were intact. Furthermore, Bauwens (1956) now considers that the syndrome which he previously designated as 'terminal neuritis' is one of neuromyositis, while Richardson (1956) found evidence of nerve involvement (spontaneous fibrillation in the electromyogram, and abnormal intensity-duration curves) in eight of twenty cases of polymyositis which he examined. Against these observations must be set those of Lambert et al. (1954) who claim that fibrillation is not necessarily indicative of a neuropathic lesion, as it was present in many of their cases of polymyositis, in which nerve conduction velocity was normal; this velocity was invariably reduced in cases of polyneuropathy. Furthermore, Cöers (1953, 1954), using a technique of intratral staining of the terminal intramuscular axons with methylene blue, found these terminal axons to be intact in two cases of polymyositis, even in areas where there was striking muscular degeneration and cellular infiltration. Admittedly, in lupus erythematosus, both polymyositis and neuritis may occur (Clark and Bailey, 1954).

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and the case of 'neuromyositis' of van Bogaert and Radermecker (1954) was possibly suffering from this disease; it is also true that peripheral neuritis is a not uncommon manifestation of 'connective tissue disease' of indeterminate type (Richter, 1954). It is, however, apparent that despite these observations, most clinicians will agree that clinical evidence of peripheral nerve involvement is lacking in the great majority of cases of polymyositis and dermatomyositis and that the concept of a commonly occurring syndrome of neuromyositis is not supported by published case material.

INFECTIVE AND PARASITIC MYOSITIS

Suppurative myositis due to bacterial invasion, and the uncommon syphilitic myositis have been reviewed by Adams et al. (1953) and do not require detailed consideration here, as the clinical picture of localised muscular inflammation which they produce is quite different from that of polymyositis and dermatomyositis. The 'myositis' which occurs in the early stages of Weil's disease (leptospirosisicterohaemorrhagica) is also distinctive. Furthermore, trichinosis, with its relatively acute onset, fever and myalgia has an entirely different manner of clinical presentation from that of subacute or chronic polymyositis, though diagnosis from acute polymyositis or dermatomyositis may sometimes be difficult, as periorbital oedema and conjunctival suffusion may occur in both conditions. The pathological changes in trichinasis are, of course, diagnostic, as the parasite can usually be demonstrated (Gould, 1945). Similarly, toxoplasmosis (Callahan et al., 1946) and trypanosomiasis cruizi (Wolf et al., 1952) may produce inflammatory changes in muscle, but symptoms suggesting muscular involvement are rare.

As we shall point out in the section on pathology, muscular lesions similar to those of polymyositis may be found in experimental virus myositis in animals (Rustigian and Pappenheimer, 1949). However, the clinical picture of myositis (Bornholm disease) due to the Coxsackie virus in humans (Dalldorf, 1950) is very different from that of the syndrome of polymyositis under discussion, in which a simple infective origin seems most unlikely. On the other hand, the Coxsackie virus was isolated
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by Dalldorf and Sickles (1948) from two children who presented with a clinical picture not unlike that of acute polymyositis, and the virus produced a severe polymyositis in suckling mice and hamsters. The absence of pathological evidence makes it difficult to classify the cases of "epidemic myositis" described by Williams (1941), but the fact that they followed T.A.B. and tetanus toxoid inoculation makes an allergic basis probable, and it may be that the symptoms, though relatively transient, were produced by muscle lesions similar to those of polymyositis.

It has become increasingly apparent that sarcoidosis may present as a predominantly muscular affliction and that in some cases the condition may be impossible to distinguish clinically from the form of polymyositis which is discussed in this monograph, though the histological changes are distinctive, revealing the characteristic sarcoid granuloma. Sarcoidosis of muscle was first diagnosed on the basis of biopsy findings by Mucha and Orzechowski (1921), while subsequent descriptions have been given by Sundelin (1923), Pautrier (1940), Krabbe (1949) and Myers et al. (1952). Sometimes the muscular atrophy is accompanied by evidence of peripheral neuritis or corticospinal tract dysfunction, and the clinical picture resembles that of peripheral nerve, spinal root or motor neurone disease, while at the same time there may be evidence of cerebral and meningeal involvement or of erythema nodosum (de Morsier et al., 1954; Lafon et al., 1955). In other cases, however, the clinical picture is that of an atypical myopathy or subacute polymyositis (Lafon et al., Coërs, 1956), though sometimes the peripheral muscles are principally involved (Devic et al., 1955). Improvement following cortisone therapy has been described (Devic et al.).

PRIMARY GENERALISED MYOSITIS FIBROSA AND RELATED DISORDERS

According to Burton et al. (1923), Volkmann was the first to suggest that a slowly progressive condition of chronic fibrosing myositis, giving rise to increasing replacement of muscle by fibrous tissue with consequent contracture, could be distinguished from other forms of myositis. A fatal case of this type was reported by Batten (1904), and it is of interest to note that there was an associated congenital anomaly in that the patient's great toes were much shorter than the others. As Ford (1952) points out, this congenital abnormality is common in patients with progressive myositis ossificans. Although the case described by Burton et al. ran a progressive course, and the muscles generally became contracted, firm and woody, the histological changes in a biopsy specimen (segmental necrosis, cellular infiltration) were identical with those observed in polymyositis and dermatomyositis. In addition, Keil (1940) points out that one of the two cases described by Blau (1938) as fibrosing myositis had a skin rash, fever and dysphagia in the early days of the illness. Furthermore, the course of the illness in the child of eleven reported by Stewart and MacGregor (1951) as an example of generalised myositis fibrosa was not essentially different from the progression noted by Wedgwood et al. (1953) and Matthews and Burke (1953) in some of their cases of dermatomyositis in childhood. Van Boeckel et al. (1955) and Garde et al. (1955) agree that most such cases do not represent a separate disease entity, but are merely examples of a chronic, progressive form of dermatomyositis or polymyositis. We believe, as a result of our own experience, that this conclusion is correct.

On the other hand, it is important to realise that the principal site of injury produced by the disease process may vary from case to case. For example, in the case of subacute polymyositis described by Bernheim et al. (1954) there was a striking absence of muscle fibre lesions and inflammatory cells in the biopsy specimen and yet the response to ACTH was dramatic. The authors suggested that in this case the disorder was principally one of the connective tissue. Many cases of chronic fibrosing myositis may represent this type of change in chronic form; we believe that they should certainly be included in the syndrome of polymyositis.

It must, however, be remembered that a similar condition, both clinically and pathologically (save for the presence of inflammatory cells) may be the end-state of a number of other diseases, such as progressive muscular dystrophy, senile and retractive myosclerosis (Garde et al., 1955) and the familial myosclerosis described by Cordier et al. (1952) and by Löwenthal (1954). In the latter condition a progressive sclerosis of
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muscles, with contracture and restriction of joint movements occurred, like that seen in arthrogryphosis multiplex congenita; and it was suggested that the disorder was a familial degenerative disease of the intermuscular connective tissue.

RELAPSING MYOSITIS

McLetchie and Aikens (1952) described a syndrome of relapsing myositis, characterised by the appearance, after a febrile episode, of swelling in the thigh muscles and subsequently in the biceps brachii. Muscle biopsy demonstrated foci of necrosis or hyaline degeneration of muscle fibres, a striking mesenchymatous reaction with inflammatory infiltrates, signs of muscular regeneration and integrity of vessels. We have seen two such cases, one of which is included in the present series (Case 5), and from the natural history of the illness as well as the histological findings and response of the disorder to cortisone therapy (in one case), we believe the condition to be a relatively localised form of polymyositis.

POLYMYOSITIS WITH OTHER DISEASES OF THE 'COLLAGEN' GROUP

The connection between polymyositis, dermatomyositis and the other collagen diseases, a relationship which has been adduced by many authors, has already been stressed. It cannot be denied that many cases may show at some stage clinical features which are entirely characteristic of scleroderma or of disseminated lupus erythematosus. In other instances, a constellation of heterogeneous symptoms and signs, including muscular involvement, may develop as separate manifestations of a single prolonged though remittent illness. It is the kaleidoscopic course of such cases which has emphasized the relationship of polymyositis, and of dermatomyositis particularly, to other conditions within the group.

Dermatomyositis and scleroderma

Hutchinson in 1890 first underlined the existence of muscular atrophy in scleroderma, while Thibierge also remarked upon the muscular changes which could develop in such cases. With Weissenbach (1911) he subsequently stressed the occurrence of dysphagia. Oppenheim (1899) and Petges and Céjat (1906) described cases of dermatomyositis in which the skin became progressively sclerodermatous in appearance, and this course of events has been documented by many authors writing subsequently (Nixon, 1907; Langmead, 1923; Rosenthal and Hoffmann, 1923; Brock, 1934; Dowling and Griffiths, 1939; Banks, 1941; Sheard, 1951; Wedgewood et al., 1953; Pagel and Treip, 1955). The cases of scleroderma in association with myopathy described by Ballet and Delherm (1903) and Bergouignan et al. (1950) were clearly examples of dermatomyositis, as was that of scleroderma with myasthenia gravis reported by Weber and Bode (1932), as Weber (1938) later admitted. Many authors (Dowling and Freudenthal, 1938; Freudenthal, 1940; Pagel and Treip, 1955) suggest that dermatomyositis and scleroderma are different clinical manifestations of a single disease. As Garcia et al. (1955) point out, it is often difficult to know whether to classify a case as 'polymyositis with scleroderma' or as 'scleroderma with myositis'. Goetz (1945), Beigelman et al. (1953), and Pagel and Treip (1955) suggest that the term 'progressive diffuse sclerosis' would be preferable to that of scleroderma in view of the constant changes which affect the viscera as well as the skin. The occurrence of calcinosis in these cases will be considered shortly.

Dermatomyositis and disseminated lupus erythematosus

Keil (1940) and Banks (1941) observed several cases in which there was a transition from the clinical picture of disseminated lupus erythematosus (L.E.) to that of dermatomyositis. Klemperer et al. (1941) found inflammatory infiltrates in the muscle of five of thirty cases of L.E. and in one of these there was a striking polymyositis. Degos (1945) reported a fatal case of dermatomyositis in which there was a phase of acute L.E. with the manifestations of the Libman-Sachs syndrome, while Degos et al. (1949) found electromyographic and muscle biopsy findings characteristic of dermatomyositis in a case of subacute L.E. Cases in which there was a long transitional period (five to twenty years) between the two phases of the illness, have been described by de Graciansky (1949, 1953) and
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by Garcin et al. (1955). Page and Treip (1955) in drawing attention to further transitional cases and to the constant occurrence of histological changes in the muscles, suprarenals and nail-bed in dermatomyositis and in L.E. suggested that these two conditions should be grouped with scleroderma under the inclusive term ‘viscero-cutaneous collagogenosis’.

Dermatomyositis, polymyositis and polyarteritis nodosa

Muscle lesions are a prominent feature of the pathological process in polyarteritis nodosa and have been referred to as a ‘polymyositis’ (Boyd and Nusbaurn, 1936), but the symptoms and signs which they produce are not generally similar to those of the polymyositis syndrome under consideration. As Adams et al. (1953) have mentioned, muscle pain and tenderness, often relatively localised, may occur in polyarteritis nodosa, and may be the result of muscle infarction, while the characteristic vascular lesions are discovered histologically; a ‘pseudo-polymyositis’ clinical syndrome like that of polymyositis does not occur in this disease. However, Radermecker and van Bogaert (1952) describe a case in which polyarteritis presented as a subacute polymyositis, with generalised subcutaneous oedema and muscular induration, although there was also generalised arthralgia, lymphadenopathy and splenomegaly. Caldwell (1957) has suggested that all cases of acute polymyositis are probably due to a diffuse muscular form of polyarteritis nodosa, but this view is not supported by many reports of cases in the literature in which no arteritis lesions were seen on histological examination. Furthermore, as Garcin et al. (1955) point out, no examples of transitional states between polymyositis and polyarteritis have been described.

Polymyositis and ‘interstitial nodular polymyositis’

Many authors have discovered interstitial infiltrates of inflammatory cells in the muscles of patients who made no complaint of muscular pain or weakness but who were suffering from acute rheumatism, rheumatoid arthritis, disseminated lupus erythematosus and scleroderma (Curtis and Pollard, 1940; Steiner et al., 1946; O’Leary, 1946; Adams et al., 1953; Leinwand et al., 1954; Coers, 1956). Although this pathological finding

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is clearly non-specific, as a similar finding may be noted in cases of thyrotoxicosis and myasthenia gravis (Russell, 1953). It is apparent that transitional states may occur between this asymptomatic nodular interstitial myositis in cases of the type referred to above, and the clinical syndrome of polymyositis which may be associated with any of these ‘collagen’ diseases (Garcin et al., 1955; Walton, 1956). The significance of this finding will be discussed subsequently.

Dermatomyositis and panniculitis

In 1924, Weber and Gray described a condition of ‘chronic relapsing polydermatomyositis with predominant involvement of the subcutaneous fat’. There was no histological confirmation of muscular involvement in their cases and subsequently the condition has been generally referred to as chronic relapsing panniculitis or the Weber-Christian syndrome (Kennedy and Murphy, 1949). These patients suffer a febrile illness in which scattered tender nodules develop in the subcutaneous tissue throughout the body with induration and reddening of the overlying skin. Histologically there is hyaline degeneration of subcutaneous collagen. In the case described by McNicholl (1952), there was muscular involvement similar to that noted in the relapsing form of myositis referred to above. Some cases of this type respond to treatment with cortisone, the muscular lesions, when present, are like those of polymyositis and there is good reason for suggesting that this rare condition may be closely related to dermatomyositis.

Calcinosis universalis, myositis ossificans and Werner’s syndrome

Calcinosis universalis, in which there is progressive and widespread calcification of the subcutaneous tissue, is no longer believed to be a separate disease entity. Subcutaneous calcification in cases of scleroderma was first described by Weber in 1878 and this association was later stressed by Meachen (1903), Thibierge and Weissbach (1911), Langmead (1923) and by Atkinson and Weber (1933), who claimed that calcification occurred in as many as a third of cases of scleroderma. Leinwand et al. (1954) found the incidence to be somewhat lower, as this feature was present in only ten of their one hundred
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and fifty cases. In view of the relationship between scleroderma and dermatomyositis upon which we have already commented, it is more than likely that muscular lesions were present in many of these cases.

The development of calcinosi in a case of florid dermatomyositis was described by Petges (1932) and calcium deposits have been known to appear as long as three to five years after the onset of the primary disease (Nørregaard, 1948; Rudolph, 1934). They can occur in all forms of polymyositis and dermatomyositis (Garcin et al., 1953) and the calcium may be deposited not only in the subcutaneous tissue (Brock, 1934; O’Leary and Waisman, 1940) but also in the tendons and in the muscles and aponeuroses (Keil, 1940). The calcification may be particularly extensive in children; in one of the cases described by Wedgwood et al. (1953) the abdominal wall seemed almost to be ‘armou

plated’. Recent evidence gives support to the view that calcinosi is usually a sequel of dermatomyositis (Hecht, 1940; Nørregaard, 1948), but there are occasional cases in which there is no clear evidence of this relationship (Briggs and Illingworth, 1952). It is of considerable interest that the condition may resolve spontaneously (Shelton, 1936) and that the calcium may be absorbed following cortisone or ACTH therapy (Briggs and Illingworth, 1953). Whether or not progressive myositis ossificans, as described in detail by Nutt (1923) and Uhlinger (1936), is related to calcinosi universalis is somewhat problematical. The fact that true bone rather than simple calcium deposits is laid down in the muscle would seem to identify it as a separate entity. Furthermore, Ford (1952) lays stress on the associated congenital abnormalities of the bones of the feet (short or absent 1st metatarsal) which are so often seen in myositis ossificans, and points to the fact that in the latter disease the bone is deposited in the muscle, while calcinosi is generally confined to the connective tissue, where it seems to begin around degenerate fat cells (Bauer et al., 1931). On the other hand, in Case 32 of the present series, there was calcification outlining the belly of the gastrocnemius, though seeming to be principally in the perimysium and in fascial planes. It is also recognised that calcium deposition in muscle, sometimes followed by ossification, may follow several types of muscle injury (Adams et al., 1953).

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Mair (1932) concluded that the primary lesion in myositis ossificans was one of the endomysial connective tissue and not of the muscle fibre itself. Hence there may well be a close relationship between the pathological process in calcinosi universalis (following polymyositis or dermatomyositis) and that in myositis ossificans; however, the first appears to be related to the ‘collagen’ group of diseases, while the second is a degenerative disorder, possibly genetically determined, and analogous in this sense to the familial myosclerotic disorders previously mentioned.

Another diffuse degenerative disorder which may show superficial resemblances to polymyositis or dermatomyositis, but which by virtue of its many constant associated abnormalities is clearly a separate and distinctive entity, is Werner’s syndrome. Werner in 1904 described the disorder as ‘cataract in association with scleroderma’. Thannhauser (1945) gives a comprehensive review of the condition and two recent cases, in sisters, have been described by Ellison and Pugh (1955). Though usually developing in adult life, the condition may rarely begin in early childhood (Shelby and Vaughn, 1951). It is characterised by short stature, thin, tapering limbs, a protuberant abdomen and sparseness of the hair; presenile cataracts appear, and osteoporosis, diabetes mellitus and hypogonadism are frequent. The skin is characteristically tense, shining and hide-like, ulceration and peripheral necrosis are frequent and cutaneous calcinosi circumscripta may appear. Many cases of this type are probably included by Continental authors in the syndrome of Bonnevieve-Ullrich (Ullrich, 1949), but the condition in its fully developed form is clearly very different. Moreover it should be separated from that of primary gonadal agenesis (Turner’s syndrome) which is also embraced by the latter group. Though the scleroderma and muscular atrophy of Werner’s syndrome may show pathological features similar to those of dermatomyositis, the genetic basis of the disorder and the numerous associated defects clearly differentiate it from the diseases of the ‘collagen’ group.
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POLYMYOSITIS OR MYOPATHY WITH MYOGLOBINURIA

It is well recognised that myoglobinuria may occur, and may even be fatal, through blockage of the renal tubules, in any condition which gives rise to massive destruction of muscle, like the 'crush' syndrome (Bywaters et al., 1941), massive muscle infarction (Bywaters and Stead, 1945), or the 'anterior tibial syndrome' (Adams et al., 1953). Myopathy resulting from carbon monoxide poisoning may have a similar result (Günther, 1940; Brass, 1944). However, at least one apparently specific disorder associated with myoglobinuria has been described, namely paroxysmal idiopathic myoglobinuria (Meyer-Betz, 1911; Hittmair, 1925; Kreutzer et al., 1948). Admiring reviews of this subject have been given recently by Elek and Anderson (1953), Acheson and McAlpine (1953), and by Reiner et al. (1956). Patients suffering from this complaint experience acute episodes of muscular pain and weakness during which myoglobin is passed in the urine. Some of the reported cases have suffered severe attacks, with widespread paralysis, but followed by complete recovery (Meyer-Betz, 1911), while others have experienced repeated minor episodes of muscle pain without weakness, during each of which myoglobinuria has been observed (Kreutzer et al., 1948). Several patients with minor attacks have later suffered severe ones, and vice versa. In at least four cases (Günther, 1924; Paul, 1924; Bywaters and Dible, 1943; Stokes, 1952) a first attack was fatal owing to renal damage. On occasion the disorder has affected more than one member of a sibship (Hed, 1947), although as Elek and Anderson point out, there is no satisfactory evidence to suggest that the disease is truly hereditary. That environmental factors, such as exposure to a common toxin, may be responsible for a familial incidence is shown by the close resemblance of this 'idiopathic' disorder to HaA disease (Starfinger, 1932) in which a similar syndrome appears in susceptible individuals following the ingestion of tainted fish. The occurrence of a similar syndrome in animals has been discussed by Elek and Anderson (1953), and by Reiner et al. (1956). A particularly severe outbreak occurred in horses in Paris early in this century when they returned to work following a cab strike. The acute myopathy with myoglobinuria which occurs in adolescent sheep following exertion (Hartley, 1953; Dodd, 1954; Marr et al., 1956) is probably similar. Carlström (1931) found a raised blood lactic acid in the horse condition during attacks but similar findings have not been observed in man. The suggestion that humans with the condition may harbour an abnormal myoglobin (Berenbaum et al., 1955) has not been supported by electrophoretic studies (Frankel, 1956) and others have suggested that the muscle cell membrane may be at fault (Spaet et al., 1954).

Most authors agree that the characteristic change observed in muscle biopsy specimens removed from such cases in the acute stage is one of focal or segmental degeneration of muscle fibres. Variable numbers of muscle fibres show a hyaline or vitreous change, with pallor and loss of normal staining characteristics; usually this affects only a segment of the fibre, the remainder of which appears normal. Occasionally, however, the whole fibre is involved or may contain several distinct areas of segmental damage. Probably the number of fibres affected in any given attack will account for the variations in severity of the clinical picture. Several authors have suggested that this appearance is the result of loss of myoglobin from the affected segment. We have been able to confirm the presence of these pathological changes in three recent cases from which muscle biopsy material has been made available to us, but of course these changes are non-specific as is the prominent regeneration of muscle fibres which occurs. The segmental hyaline necrosis does not differ significantly from that seen in polymyositis, and it seems possible that the loss of myoglobin may be the result rather than the cause of the local lesion. Of much greater significance is the almost total absence of inflammatory cells.

It is important to consider the relationship of this disorder to other diseases of muscle, including polymyositis and muscular dystrophy. It is evident that the clinical picture of a single episode could readily be taken for a very acute attack of polymyositis, while the histological changes, save for the absence of cellular infiltration, are virtually identical with those seen in the
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Furthermore, the presence of cutaneous oedema and erythema in certain cases (Acheson and McAlpine, 1953; Scherwin, 1945) may heighten the clinical resemblance. Indeed, two of the fatal cases previously reported (Paul, 1924; Günther, 1924) have been referred to as examples of dermatomyositis (Elek and Anderson). It is certainly true that the pathological changes are much more like those of polymyositis than muscular dystrophy. On the other hand, the curiously paroxysmal nature of this disorder, the fact that attacks may be provoked by exertion (Hed, 1947) and may be associated with other metabolic abnormalities (Hed, 1947; Acheson and McAlpine, 1953), along with the absence of infiltration with inflammatory cells, would appear to stamp this condition as a distinctive metabolic disease, unrelated to the accepted syndrome of polymyositis or dermatomyositis. However, it must be pointed out that any disease in which rapid destruction of muscular tissue occurs is capable of causing the excretion of myoglobin. It is, therefore, conceivable that a case of classical polymyositis or dermatomyositis could cause a temporary myoglobinuria. Probably the only way in which such a case could be distinguished from the metabolic disorder referred to above would be by the absence of a history of previous attacks, and by finding of cellular infiltrates in a muscle biopsy. In fact, we have included three cases with myoglobinuria in the present series. One may have been an example of the idiopathic paralytic form but the others were clearly examples of acute polymyositis with secondary myoglobinuria.

The relationship of myoglobinuria to muscular dystrophy is much more difficult to understand. Wasting of muscles may certainly occur as a sequel to attacks of the idiopathic paroxysmal form (Meyer-Betz, 1911). However, attacks of myoglobinuria, provoked by exercise, have been described in individuals regarded as cases of muscular dystrophy, and with a strong family history of the latter disease (Louw and Neilsen, 1944; Wissler, 1948). It seems to us that either the individuals referred to were not suffering from true muscular dystrophy or that muscular dystrophy and paroxysmal myoglobinuria were associated by chance. This view is supported by the fact that only one of the several dystrophic individuals in each family suffered from myoglobinuria. The cases described by Kreutzer et al. (1948) and by Acheson and McAlpine (1953) seem to us to be in an entirely different category, despite the presence of a family history of muscular dystrophy in the latter case. To take this patient as an example, the clinical features and natural history of the disease, as described, were quite unlike those of any recognised form of muscular dystrophy. Muscular weakness and wasting was minimal, despite the length of history, while the muscle biopsy and electromyographic findings were much more like those we have come to expect in polymyositis than in muscular dystrophy. These two cases were probably showing the residua of repeated attacks of idiopathic paralytic myoglobinuria, rather than muscular dystrophy in the accepted sense of the term. It seems inconceivable that the slowly progressive pathological change which one observes in typical muscular dystrophy could ever in itself be responsible for massive myoglobinuria. Yet so little is known of the nature of the disease process in this group of conditions that any conclusion seems premature.

MENOPAUSAL OR ‘LATE-LIFE’ MUSCULAR DYSTROPHY

Undoubtedly true progressive muscular dystrophy of the limb-girdle type may occasionally begin in late adult life (Walton and Nattrass, 1954), but it has become increasingly evident that many cases so diagnosed are suffering from a disease which is different both in natural history and pathology. Indeed the clinical and pathological features described by Nevin (1936) in his two cases of late-life myopathy, and by Denny-Brown (1939) in a case with myopathy limited to the quadriceps, leaves little doubt that these patients were suffering from a chronic form of polymyositis (Denny-Brown, 1952; Adams et al., 1953). The same is undoubtedly true of the twelve cases described by Shy and McEachern (1951) under the title of ‘menopausal muscular dystrophy’ and the six reported by Bonnin and Adey (1954) as examples of the latter condition. This conclusion is supported not only by the striking similarity of the clinical manifestations in these cases to those observed in some patients with polymyositis, but also by the identical pathological findings, and by the
response which some patients show to cortisone therapy. Eaton (1954), Garcin et al. (1955), van Bogaert et al. (1955) and Coërs (1956) agree that this disorder is simply the chronic 'pseudomyopathic' form of polymyositis.

MYASTHENIA GRAVIS AND POLYMYSITIS OR MYOPATHY

As Benedek (1944), Christensen and Levison (1950), Ragan (1950) and Reese and Harman (1954) have pointed out, certain undoubted cases of dermatomyositis or polymyositis show a muscular fatigability of characteristically myasthenic type which can be reversed by prostigmine, and this improvement may be sustained with continuous administration of the drug. Brückel et al. (1951) examined such a case by means of ergographic and electrical methods and demonstrated a fatigue curve very like that of myasthenia gravis; this fatigue could be readily corrected by tension or prostigmine. This type of fatigability was also noted by van Bogaert and Radermecker (1954) in one of their cases, but was of short duration and quickly recovered without the need for prostigmine. Further cases demonstrating this association have been described by Eaton (1954), Bonduelle et al. (1955) and Coërs (1956), while Paterson (1956) has discussed the relationship in detail. In one of the cases of Bonduelle et al. (1955) in which there were marked skin lesions, the response to prostigmine (up to 600 mg. daily) was dramatic and sustained, but complete recovery followed cortisone therapy; a second case, with dysphagia, dysarthria and wasting of shoulder girdle muscles, but without dermatitis, also responded dramatically to prostigmine. It is of interest that a similar effect of this drug has been described by Harvey et al. (1954) in cases of systemic lupus erythematosus. For reasons we have discussed earlier, it is very probable that these cases had associated polymyositis lesions. In a similar case referred to by Rowland (1955—Case 4) as a probable example of lupus erythematosus which showed a temporary response to prostigmine, the published description is equally compatible with a diagnosis of polymyositis. The same author describes another patient (Case 5) who was regarded for some years as a case of myasthenia gravis, but who was almost certainly suffering from the polymyositis syndrome. In this connection, a further report of Bonduelle et al. (1955) is of some importance; a patient with subacute, fatal polymyositis, but without any evidence of myasthenic fatigability, was found at autopsy to have a thymoma. The observation of myotonia, both clinical and electromyographic, in a case of polymyositis (Layani et al., 1955) is also worthy of note. In view of the numerous reports of myasthenic fatigability in polymyositis, Richardson (1956) has examined seven cases of dermamyositis, one of lupus erythematosus and two of acute polymyositis with the C10 (decamethonium iodide) technique described by ChurchillDavidson and Richardson (1952). These workers discovered that patients with myasthenia gravis were abnormally resistant to this drug, which seemed to produce in them a competitive inhibition block rather than the depolarisation block which developed in normal individuals. All of Richardson's cases showed a normal response and he concluded that if a defect in neuromuscular transmission does occur in dermatomyositis and polymyositis it must be uncommon.

The position is made more difficult by the fact that certain long-standing cases of myasthenia gravis develop muscular wasting of proximal distribution in the limbs (Simpson, 1956), while other cases of long standing myopathy, which have been referred to as 'myasthenic myopathy' (Walton and Nattrass, 1954; Walton et al., 1956) show myasthenic fatigability. Furthermore, as will be seen shortly, polymyositis and a syndrome resembling myasthenia gravis may be seen alone, or in combination (Coërs, 1956; Eaton and Lambert, 1957), in association with malignant disease. Histological studies are of relatively little value in differential diagnosis, for the changes in the muscle in cases of severe myasthenia gravis (Weigert, 1901; Buzzard, 1905; Querido, 1929; Russell, 1953; Mandelow and Genkins, 1954; Störtebecker, 1955; Rowland et al., 1956) may be indistinguishable from those of polymyositis. For example, it is apparent that many severe myasthenics may show necrosis and phagocytosis of muscle fibres and interstitial infiltration by lymphocytes and other inflammatory cells as well as myocardial degeneration. The clinical and histological features in the case described by Sandifer (1955) as 'myasthenic myopathy', and in that of myasthenia gravis reported by Woolf and Till (1955)
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and Woolf et al. (1956) are equally compatible with a diagnosis of polynmyositis. These difficulties have led Rowland (1955) to suggest that any case responding unequivocally to prostigmine or tensilon should be called myasthenia gravis, but that the latter condition is probably a syndrome of varied etiology which may sometimes be associated with other diseases such as polynmyositis, muscular dystrophy, malignant disease and thyrotoxicosis, and not a single disease entity. Coërs (1956) agrees with this conclusion and suggests that myasthenia may sometimes result from a parenchymatous lesion of the muscle fibre; he believes that the occasional association with polynmyositis may explain the response to cortisone described by Torda and Wolff (1949) in myasthenia gravis. It may therefore be concluded that a clinical syndrome indistinguishable from that of myasthenia gravis may occur in certain cases of polynmyositis and dermamysitis, and that the borderline between uncomplicated myasthenia and these conditions is ill-defined.

DERMATOMYOSITIS, POLYMYOSITIS AND MYOPATHY IN CASES OF MALIGNANT DISEASE

Schuermann (1939) suggests that Stertz in 1916 first noted an association between dermamysitis and malignant disease, but the relationship between the two conditions received little attention until Bezecny's paper in 1935. In two of the forty cases of dermamysitis reported by O'Leary and Waisman (1940) and in one of Sheard's (1951) patients carcinomata were discovered, while no fewer than eight (17-7 per cent) of the forty-five cases described by Curtis et al. (1952) were suffering from malignant disease. Additional cases showing the association have been reported or referred to by Dostrovsky and Sagher (1946), McCombs and MacMahon (1947), Oppel et al. (1950), Brunner and Lobraco (1951), Cottel (1953), Forman (1952), van der Lugt (1952), Adams et al. (1953), Boulton et al. (1953), Simpson (1953), Midana and Leone (1953), Duverne et al. (1954), Mitchell and McCarthy (1955), Garcin et al. (1955), Caldwell (1955), Coërs (1956) and Richardson (1956). Domalski and Morgan (1955) review fifty-one cases of dermamysitis previously reported in which malignant disease was discovered. The neoplasms described were often carcinomata of the lung but in a number of cases a carcinoma was discovered in other organs, including breast, stomach, ovary, gall-bladder and bowel, while Bonduelle et al. (1955) described acute polynmyositis without myasthenic features occurring in a patient with a thymoma. Furthermore, Schwachmanna (1950) observed a child with acute leukaemia who developed dermatomyositis. Sometimes the malignant growth was found before the muscular disease became apparent but in many cases the neoplasm remained undiscovered for some time after the onset of the dermatomyositis.

In the great majority of the cases referred to above the muscular disorder took the form of a florid dermatomyositis, but in a small proportion there were no overt skin changes; it should, however, be remembered that many cases of subacute or chronic polynmyositis may have gone unrecognised in patients with malignant disease as this condition is much less dramatic in its manifestations. In the cases of Garcia et al. (1955) and of Coërs (1956) the condition was one of chronic polynmyositis with superadded myasthenic features and in this connection it is of interest to note the recent reports of a syndrome like myasthenia gravis occurring in cases of bronchogenic carcinoma (Anderson et al., 1953; Mackenzie, 1954; Shafar, 1954; Thomas, 1954; Borelli and Keen, 1954; Eaton and Lambert, 1957). Furthermore, Rosch (1954) has pointed out that the association with malignant disease does not apply to dermatomyositis and polynmyositis alone but also to other diseases of the collagen group (Dostrovsky and Sagher, 1946; McCombs and MacMahon, 1947; Lipman and Tober, 1950). In addition, muscular lesions were present in Denny-Brown's (1948) two cases of sensory neuropathy in association with bronchogenic carcinoma.

Recently, Henson et al. (1954) and Heathfield and Williams (1954) have described muscular weakness, usually affecting the proximal portions of the limbs and often running a remittent course, in several patients with malignant disease, not only in the lung, but in other situations. They referred to the condition as one of 'carcinomatous myopathy', although as Henson (1953) remarked, the clinical features were often those of a polynmyositis. The cases of 'proximal motor neuropathy' in patients with bronchogenic carcinoma described by Hart (1954)
were similar; he postulated a secondary deficiency of vitamin 
B in these cases, but the evidence in support of this view was not 
convincing and one of his cases actually had a skin rash. It is 
true that the pathological changes in the muscle of patients with 
‘carcinomatous myopathy’ (Henson et al.) were often scanty 
and indefinite and entirely different, as Garcia et al. (1955) have 
agreed, from those of florid dermatomyositis and polymyositis. 
On the other hand, as will be seen, some clinical cases of un-
doubted polymyositis show remarkably few pathological changes 
to account for the degree of muscular weakness and wasting. 
The striking clinical similarity between subacute or chronic 
polymyositis on the one hand and carcinomatous myopathy on 
the other, together with the association, common to both, with 
malignant disease, has led us to conclude that the two conditions 
are closely related. We do not wish to infer that all cases of 
polymyositis have a common etiology. As we have pointed out 
in the preface, and will elaborate later, we are using the term 
‘polymyositis’ to describe a clinical syndrome which is associ-
ated with certain characteristic though non-specific patho-
logical changes, of variable severity, in muscle. The syndrome 
may later prove to embrace several disease entities; but for the 
moment we feel that it is wiser to consider cases of this clinic-
opathological type collectively rather than to identify ‘carcino-
matous myopathy’ as a distinctive disease.

The pathogenesis of these muscular and dermatological 
complaints has led to much discussion. As Garcia et al. (1955) 
point out, a direct toxic effect of the catabolic products of the 
cancer cells (Midana and Leone, 1953) is most unlikely in view of the cases in which the malignant 
disease does not become apparent for months or years after the 
appearance of dermatomyositis. Similarly, an endocrine 
effect (Dostrovsky and Sagher, 1946) would seem improbable. 
An allergic reaction to the products of the growth seems 
possible, particularly in view of the fact that the derma-
tomyositis may respond to cortisone or ACTH therapy despite 
persistence of the neoplasm (Schwachmann, 1950; Curtis 
et al., 1952; Garcia et al., 1955). Henson et al. (1954) suggest, 
however, that carcinomatous myopathy may be a separate effect 
of the carcinogenic agent which is responsible for producing 
the primary growth.

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Previous attempts at classification

Adams et al. (1953) considered acute polymyositis (including 
dermatomyositis) and chronic polymyositis separately, but in 
the light of our more recent experience, it is apparent that the 
description of chronic polymyositis given in this work is not 
entirely accurate. In particular the forms of the disease which 
may resemble muscular dystrophy are insufficiently stressed.

Eaton (1954) identified cases in which the disease process 
appeared to be confined to the muscles as ‘polymyositis’; if 
there were skin changes he preserved the conventional term 
‘dermatomyositis’, while if there was evidence of some associ-
ated disease he suggested qualification of the diagnosis as, say, 
‘polymyositis with rheumatoid arthritis’, or ‘dermatomyositis 
with carcinoma of the lung’. This classification is reasonably 
comprehensive and yet simple and the adjectives ‘acute’, 
‘subacute’, or ‘chronic’ may be added where necessary.

Van Bogaert and Radermecker (1954) suggest that all cases 
of this clinical syndrome may be embraced by one of the 
following groups: