Clinica Chimica Acta, 53 (1974) 217—220

CCA 6401

DIALYSIS EFFECT ON SERUM CREATINE PHOSPHOKINASE DURING STEROID THERAPY IN DERMATOMYOSITIS

C. SNEHALATHA, M. MASCREEN, K. VALMIKINATHAN and K.JAGANNATHAN
Institute of Neurology, Madras Medical College, Madras 600 003 (India)
(Received January 30, 1974)

Summary

Two cases of dermatomyositis have been subjected to a detailed clinical and biochemical study. The usefulness of dialysis-oriented serum creatine phosphokinase (CPK) level is discussed in relation to drug therapy.

Introduction

Institutional steroid therapy has become a common practice in the clinical treatment of inflammatory muscle disorders. Accordingly, these subjects are grouped into steroid responsive and steroid resistant types [1]. The biochemical study of these subjects is based mainly on serum creatine phosphokinase(CPK) levels. In the light of our experience of the dialysis effect [2,3] on serum CPK, we present our observations in two cases of dermatomyositis during steroid therapy.

Materials and Methods

Serum from the two cases of dermatomyositis before and during steroid therapy was assayed for creatine phosphokinase (EC 2.7.3.2; CPK) before and after dialysis as described earlier [2]. Serum aspartate aminotransferase-(glutamic-oxalacetic transaminase EC 2.6.1.1; GOT) and alanine aminotransferase(glutamic-pyruvic transaminase, EC 2.6.1.2; GPT) were determined following the colorimetric procedure of Mohun and Cook [4].

The colour intensities were measured at appropriate wavelengths using an ERMA photoelectric colorimeter, Model AE 11.

Subjects and Results

Case 1 was a female child(MIN.5442/70) of 8 years who was admitted for skin changes over the face and finger tips, weakness in the limbs of 20 days

duration and difficulty in swallowing of 1 week's duration prior to the time of admission. Examination revealed erythematous skin rashes and symmetrical weakness of girdle muscles. Tendon reflexes were sluggish. Sensation was normal. A diagnosis of dermatomyositis was made by clinical, EMG, enzymatic and histological studies.

The subject was started on oral steroid therapy of 40 mg prednisolone per day. After 3 months of therapy, she reported with some clinical improvement. At this time the serum CPK by the conventional method was 39 I.U./l whereas it was 340 I.U./l following dialysis, indicating that the disease process was still active. This was in accordance with the clinical picture of mild exaggeration of weakness of the pelvic and shoulder girdles noticed during the patient's third visit to the Institute after 1 month. On enquiry, she admitted having discontinued the therapy for some time. She was treated again with 40 mg prednisolone per day for 6 months with a satisfactory return of power in the shoulder and pelvic girdles. She is now on a maintenance dose of 5 mg per day.

Case 2 was male(MIN.1048A/72) of 58 years who came for weakness of upper extremities, pain in the muscles and joints. Examination revealed an anaemic male showing mild erythematous flushing of the face, patchy thickening of the skin, symmetrical weakness and tenderness of the pelvic and shoulder girdle muscles. Tendon reflexes were diminished. Peripheral pulses were normal. A diagnosis of derematomyositis was made and confirmed by EMG, enzymatic and histological studies.

This patient was on steroid therapy of 80—100 mg of prednisolone per day for one month and then maintained on 60 mg per day for 6 months, reducing the dose thereafter. Recent follow-up showed that total recovery and steroid therapy was suspended.

Levels of serum CPK before and after dialysis, and of GOT and GPT before and during therapy are presented in Table I. It is evident that all the enzymes studied are elevated initially. For the sake of comparison, figures for

TABLE I

SERUM ENZYME LEVELS DURING STEROID THERAPY

	Enzyme concentration (I.U./l)			
	CPK 1 in 25 dilution		GOT	GPT
	Before dialysis	After dialysis		
Case 1, MIN 5442/70				
11-1-72	252	410	86	74
90 days later	39	340	28	30
240 days later	30	155	8	10
440 days later	24	24	8	9
680 days later	24	24	7	6
Case 2, MIN 1048A/72				
11-2-72	160	320	74	68
120 days later	36	280	30	26
300 days later	29	30	8	9

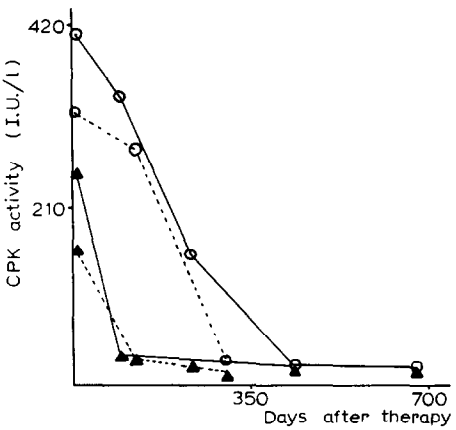

Fig. 1. CPK activity during steroid therapy. MIN.5442/70: ▲——▲, before dialysis; ○——○, after dialysis. MIN.1048A/72: ▲-----▲, before dialysis; ○-----○, after dialysis.

CPK at 1 in 25 dilution of serum in distilled water are shown. With further dilution to 1 in 400, the initial CPK figures of 2600 I.U./l in the case of MIN.5442/70 and 800 I.U./l in the case of MIN.1048A/72 rose to 4400 I.U./l and 1440 I.U./1 respectively following dialysis.

The elevated enzyme levels returned to normal after steroid therapy. This is quite in accordance with the observed satisfactory general improvement as well as the return of good power, tendon reflexes and relief from muscle pain. Since serum CPK is used as one of the biochemical parameters to assess improvement during therapy, the interesting variation in CPK levels (Fig. 1) in the present study is worthy of notice.

During initial therapy, the serum CPK level by the conventional method involving dilution alone is within the normal range. However, the CPK level of dialysed serum during the same period is almost similar to the pretreatment figure. This suggests that the disease process is still active and indicates that only a sophisticated procedure like dialysis can reveal accurately enzyme activity at this stage.

This type of variation in serum CPK levels persists in spite of fairly prolonged medication. The serum CPK level determined by both procedures is almost constant only after more than 16 months of therapy in the case of MIN.5442/70 and 10 months in the case of MIN.1048A/72 when the patients are clinically almost normal.

Discussion

The two cases of dermatomyositis we have described seem to be of the steroid reponsive type as judged by the clinical assessment and biochemical follow-up using the serum CPK level.

During early phases of steroid therapy, the serum CPK level of dialysed serum is usually higher than the corresponding value determined by the conventional method (Table I and Fig. 1). This is possibly related to some dialysable factor(s) in serum which has been shown to influence serum CPK [2,3].

Further, this type of variation in serum CPK has been found to be less pronounced during subsequent therapy. This is probably an effect of steroid therapy.

Steroid therapy seems to influence the CPK level by some modifying effect on the serum factor(s). This effect of steroid may be related to its general role in immune phenomena or its influence on the neural mechanism which has been implicated in experimental myopathy in animals [5].

It is evident from a fairly long follow-up of two cases of dermatomyositis that biochemical assessment based on serum CPK level must be essentially 'Dialysis-Oriented'. Conventional procedure of CPK assay during such therapy may be misleading.

Acknowledgements

We are grateful to Professor B. Ramamurthi, Head of the Department, Institute of Neurology, Madras for his keen interest in this study. Our thanks are due to the Superintendent, Government General Hospital and the Principal, Madras Medical College for providing the necessary facilities.

References

1 W.H.S. Thomson, Clin. Chim. Acta, 35 (1971) 193
2 C. Snehalatha, K. Valmikinathan, K. Srinivas and K. Jagannathan, Clin. Chim. Acta, 44 (1973) 229
3 K. Valmikinathan, Proc. Inst. Neurol. (Madras), 3 (1973) 75
4 A.F. Mohun and I.J.Y. Cook, J. Clin. Pathol., 10 (1957) 394
5 Mario, K. Yu, T. Wright, W.D. Dettbarn, W.H. Olson and T.N. Nashville, Neurology (Minneap.), 23 (1973) 407