A STUDY OF SERUM CHOLINESTERASE AND LACTATE DEHYDROGENASE IN MALIGNANCY OF FEMALE GENITOURINARY TRACT

by

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SUMMARY

Serum ChE levels in female controls ranged from 40 to 67 R.U./ml with a mean of 51.26 R.U./ml. Serum LDH had a range of 52 to 150 I.U./L and an average of 83.76 I.U./L.

A significant fall in serum ChE was observed in 77% cases of malignancy of female G.U.T. and a rise in serum LDH was noted in 95% cases.

There was no significant difference in the enzymes after operation.

Malignancies situated at different sites in the genitourinary tract showed no significant difference in their enzyme levels.

Thus serum levels of these enzymes would help in the early detection of malignancy of female G.U.T.

Introduction

Although histologic tissue examination remains the pivotal factor in the diagnosis of malignant neoplasia, examination of serum enzymes may supplement and/or extend information derived from histologic study. Recent studies indicate that estimation of cholinesterase (ChE) and lactate dehydrogenase (LDH) activity in serum help in the early diagnosis of cancer. Also, in a patient with disseminated cancer, the rate of growth and activity of the tumour may be roughly appraised by following serum ChE and LDH activity. The response of neoplasia to therapy may also be reflected by return of these serum enzymes to normal.

In the present study levels of serum ChE and LDH are studied in health and in malignancy female genitourinary tract

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(G.U.T.) and their diagnostic importance established.

Material and Methods

The study was conduced on 22 patients suffering from malignancy female genito-urinary tract, which included ovarious malignancy 7 cases, cervical 11 cases, uteriney 1 case, vulva 2 cases and kidney 1 case.

Control group: Comprised of 25 healthy age matched female volunteers.

Serum ChE was determined by the method of Rappaport *et al* (1959), while LDH was estimated by Wootton's (1964) method. The former was expressed in Rappaport Units per ml (R.U./ml) and the latter in International Units per litre (I.U./L). One Rappaport Unit R.U.) of Cholinesterase represents the amount required to hydrolyse 1 micromole of acetylcholine in 30 minutes at 25°C at pH 7.8 under the conditions of this test.

Results

Serum ChE in controls ranged from 40 to 67 R.U./ml with a mean of 51.36 R.U./ml ± 7.36. Serm LDH in controls had a range of 52 to 150 I.U./L with an average of 83.76 I.U./L ± 21.56.

The fall in serm ChE in female of G.U.T. malignancy and the rise in serum LDH in this malignancy, as compared to control series was statistically significant ($P < 0.05$) (Table I).

Variable levels in both the enzymes were obtained at different sites of female G.U.T. (Table I). The maximum alteration in both the enzymes was noted in malignancy of ovary. No difference was observed in the levels of serum ChE and LDH between cancer of the ovary and cervix. However, in comparison to control series, the individual groups showed a significant difference ($P < 0.05$) in the levels of both the enzymes (Table I).

TABLE I

Serum ChE and LDH Level in Malignancy of Female G.U.T.

Cases	No. of cases	ChE (R.U./ml)		LDH (I.U./L)		
		Range	Mean	Range	Mean	
1. Ovarian malignancy	7	15-46	32.28 ± 10.67	107-294	245.28 ± 64.27	
2. Malignancy of cervix	11	29-42	34.82 ± 3.73	191-262	214.54 ± 26.18	
3. Malignancy of uterus	1	—	38.00	—	199.00	
4. Malignancy of vulva	2	37-40	38.50 ± 2.12	187-228	207.50 ± 28.99	
5. Nephroblastoma	1	—	38.00	—	231.00	
6. Total cases	22	15-46	34.63 ± 6.61	107-294	223.72 ± 42.45	
7. Control	25	40-67	51.36 ± 7.36	52-150	83.76 ± 21.56	
				1:2	(P>0.05)	(P>0.05)
				1:7	(P<0.05)	(P<0.05)
				2:7	(P<0.05)	(P<0.05)
				6:7	(P<0.05)	(P<0.05)

TABLE II

Serum ChE and LDH Levels Pre and Post-Operatively in Malignancy Ovary

Cases	No. of cases	ChE (R.U./ml)		LDH (I.U./L)	
		Mean	S.D.	Mean	S.D.
1. Preoperative	4	28.00	11.74	279.00	19.13
2. Postoperative	4	35.00	11.91	236.00	46.48
		1:2 (P>0.05)		(P>0.05)	

Four cases of malignancy of ovary were followed post-operatively (8 to 14 days). Although there was a rise in serum ChE level and a fall in serum LDH level in postoperative cases, as compared to values before operation, yet this change was statistically insignificant ($P < 0.05$) (Table II).

Discussion

Significantly low serum ChE levels were found in 77.3% cases of female G.U.T. malignancy as compared to controls. Lowest value of this enzyme was seen in malignancy of ovary and the highest in malignancy of vulva, but the difference was insignificant. Although the level of serum ChE increased after operation in cases of malignancy of ovary, the difference was not significant. This could be due to metastases to distant organs, which could not be removed at the time of operation, leading to low enzyme levels even postoperatively.

This fall in serum ChE could be due to liver derangement and cachexia (Williams *et al,* 1957), production of an inhibitor during malignancy (Wetstone *et al,* 1960; Kaniaris *et al,* 1979) or decreased synthesis by the liver, as a result of metastasis into this organ (Batabayal and Bhattacharya, 1979).

Serum LDH activity determined in 22 cases of female G.U.T. malignancy showed a significant rise as compared to controls. High levels were seen in 95.45% cases. One case of borderline malignancy (ovary) exhibited normal value. High values were obtained by many workers (Berti *et al,* 1979; Jurga *et al,* 1978; Awais, 1973). Although there was a fall in the mean serum LDH value in post-operative cases of ovarian malignancy (4 cases), yet it was insignificant. Fall in enzyme level after treatment was observed by Awais (1973) and Berti *et al* (1979).

The increase in LDH activity was attributed to high glycolytic activity of malignant tissue (Awais, 1973).

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