

ROLE OF VAGINAL SUCCINIC DEHYDROGENASE (SDH) IN FERTILITY OF WOMEN

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SUMMARY

Three categories of women, i.e. normal/fertile, primary infertile and secondary infertile were associated in this investigation. The vaginal secretions were collected with vaginal tampons and processed for the estimation of SDH by the method of Kun and Abood. (1949).

The concentration of SDH was found higher in both categories of infertile women in comparison to normal/fertile women.

INTRODUCTION

The vaginal secretion is a composite of transudate of inner cellular lining of vagina, cervical mucus and leukocytes which play very significant role in reproductive physiology. It helps in easy population and provides suitable medium for the ejaculated sperms. Not only this, the vaginal secretion has major contribution in transportation and capacitation of sperms (Brackett et al, 1978).

The biochemical analysis of vaginal secretion by earlier workers have reported the presence of proteins (Abdallah and Roig de Varagas Linares, 1970), carbohydrates (Sumawong et al, 1962), lipids (Preti and Huggins, 1978), amino acids (Gregoire et al, 1959) and acids (Hunter and Nicholas, 1959) throughout the different phases of the menstrual cycle. These bio-chemicals contribute not only in creating a suitable medium for sperms but they also provide stupendous energy for their further physiological activities.

Among different enzymes present in vaginal secretions, SDH is one which

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has a very important role in reproductive physiology, specially during cellular metabolism (Foraker and Denham, 1953).

On the basis of the above facts, the present work was undertaken to know the concentration of SDH in normal/fertile and infertile women and the findings obtained after this investigation will throw light on the causes of infertility in women.

MATERIAL AND METHODS

Adult, healthy women of reproductive age group 25-35 years were included in this investigation. The women were grouped into three categories :

- (i) Normal/fertile - those women who had given birth to children.
- (ii) Primary infertile - those women who had given birth to any child after 5-8 years of their marriage.
- (iii) Secondary infertile - those women who had not given birth to any more children after their first child.

The husbands of all the categories of women were normal having a normal semen count.

The vaginal secretions were collected with vaginal tampons by the gynaecologist. The collections was started from 5th day and continued till 28th day of the menstrual cycle. It was stopped during the menstrual flow period (1-4th day) to prevent the possible chance of blood contamination.

The vaginal tampons were inserted inside the vagina for 5 minutes and after removal it was sealed in separate vials containing 2 ml of glass distilled water. The vaginal tampons were squeezed repeatedly in vials for complete extraction of secretion from the tampons. Each vial was then centrifuged at 3000 r.p.m. for 10 minutes to separate tissue debris, present if any, and supernatant was utilized for estimation of SDH by the method of Kun and Abood (1949).

The clinical details of women donating vaginal secretions for the estimation are shown in Table I.

Table I
SHOWING CLINICAL DETAILS OF WOMEN
DONATING VAGINAL SECRETIONS

Phase of menstrual cycle	Age of women (in years)	No. of normal/fertile women	No. of Primary infertile women	No. of Secondary infertile women
Early proliferative	25 - 35	10	12	10
Late proliferative	" - "	12	12	12
Ovulatory	" - "	10	12	10
Early Luteal	" - "	12	10	10
Mid Luteal	" - "	12	12	10
Late Luteal	" - "	10	10	12

RESULTS

The results of this investigation is shown in Table II. According to the Table, the concentration of SDH is higher during the proliferative phases in all the three categories of women in comparison to luteal phases.

After comparing the results obtained between normal/fertile and primary and secondary infertile women the concentration of SDH is increased highly significantly

($P < 0.001$) in both the categories of infertile women.

DISCUSSION

As indicated in Table II, the concentration of SDH is higher during proliferative phases. The concentration higher during this period may be correlated with the earlier findings of Rosa (1960) who had clearly demonstrated the strong dependence of this enzyme on estrogen level. Since the estrogen is higher during this

Table II
SHOWING THE CONCENTRATION OF SDH IN
VAGINAL SECRETIONS OF WOMEN

Phase of menstrual cycle	Concentration in mg of dye reduced/100ml of vaginal secretions/30 minutes.		
	Normal/fertile women	Mean + S.E Primary infertile women	Secondary infertile women
Early Proliferative	11.759 ± 0.377	a*** 18.963 ± 0.300	b*** 18.611 ± 0.396
Late Proliferative	13.313 ± 0.359	a*** 19.346 ± 0.041	b*** 18.339 ± 0.364
Ovulatory	16.901 ± 0.823	a*** 21.221 ± 0.415	b*** 20.455 ± 0.091
Early Luteal	12.794 ± 0.225	a*** 17.397 ± 0.642	b*** 17.290 ± 0.748
Mid Luteal	9.720 ± 0.153	a*** 15.975 ± 0.243	b*** 16.300 ± 0.176
Late Luteal	8.027 ± 0.263	11.731 ± 0.271	b*** 11.523 ± 0.322

P value :

a*** = $P < 0.001$ between fertile & primary infertile women.

b*** = $P < 0.001$ between fertile & secondary infertile women.

period it will be quite obvious that the concentration of SDH will also be higher during this period. But during luteal phase there is decline in estrogen level and there is progesterone dominance so that concentration of SDH during this period will automatically be decreased in comparison to proliferative phase. The concentration of SDH during luteal phase can be correlated with the earlier findings of Rosa and Velaralo (1959) who reported lower SDH level during proestrus and diestrus stage of rats.

The higher concentration of SDH throughout the different phases of the menstrual cycle of infertile women might be due to disturbed estrogen/progesterone level. On the basis of the earlier findings it can be presumed that dominance of estrogen is continued till luteal phase ignoring the progesterone concentration. In other words it can be pointed out that complete menstrual cycle comes under the influence of estrogen in case of infertile women.

In normal condition this enzyme maintains the rate of cellular metabolism constant. Any possible variation in the concentration of this enzyme may disturb the normal rate of cellular metabolism which will affect the physiology of organ concerned.

It may be further added that SDH is necessary for the conversion of succinic acid into fumaric acid during citric acid cycle which is essential for complete oxidation of carbohydrates for the release of energy which may either be utilized by sperms or by vaginal cells for their

physiological activities.

In case of infertile women the concentration of SDH is higher which will accelerate the normal rate of conversion of succinic acid into fumaric acid. But the further conversion of fumaric acid into malic acid is on normal level so the over production of fumaric acid will disturb the citric acid cycle at one or more points which can further affect the rate of cellular metabolism in toto. This disturbed metabolic cycle can disturb the energy production which is necessary for vagina and sperms.

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