

ESTIMATION OF SIALIC ACID (N-acetyl neuraminic acid, 'NANA') IN CERVICAL MUCUS IN CASES OF FEMALE INFERTILITY

by

SUSHILA KHUTETA
RAKESH P. KHUTETA

and

PADMA NAGPAUL

SUMMARY

Cervical mucus plays an important role in human reproduction. Sialic acid (NANA) was estimated in 50 cases with no attributable cause to infertility where as 25 cases were taken as controls.

Cervical mucus was aspirated with micropipette. Sialic acid was estimated by Tryptophan perchloric acid reaction.

The mean value in control was 28.4 ± 3.35 ug/mg and in infertile cases was 46.6 ± 10.1 ug/mg (p value 0.001) which was highly significant.

Thus infertility to some extent could be attributed to varying concentration of Sialic acid which could prove an important diagnostic tool.

A considerable interest has been manifested in the serum carbohydrate bound protein (Glycoprotein) during the last few years centered mainly around the demonstration of elevated levels of the glycoproteins in a wide variety of human diseased state. Most difficult and challenging problem arises when the routine investigations of infertility do not show any abnormality as a cause. Cervical mucus plays an important role in human reproduction yet the physiological, physical and especially chemical mechanisms involved are only partly acknowledged and understood. In the present study NANA has been estimated in cervical mucus of

healthy normal and infertile patients suffering from infertility.

Material and Methods

The present study consisted of 25 females which acted as controls who were fertile and devoid of any organic disease irrespective of age and parity with known L.M.P. Any disease which might affect the estimation was ruled out.

Fifty women with clinically diagnosed infertility but having no obvious cause attributable to infertility and with husbands having normal fertility status were studied.

Selection of cervical mucus specimen

Cervix was exposed using a speculum. Vaginal secretion was removed with cotton.

From: Santokba Durlabhji Hospital and Research Centre, and Deptt. of Gynaecology, S.M.S. Medical College, Jaipur.

Accepted for publication on 21-3-85.

The cervical mucus was aspirated by a pre weighed micropipette with a suction rubber three valve bulb; the mucus contained in the pipette was weighed again. Contaminated samples were discarded. The samples were drawn on the day $15\text{th} \pm 2$ (ovulatory mid-cycle). Estimation of Sialic acid was done on the principle of Tryptophane perchloric acid reaction by Seibert *et al* 1984. Control, standard and tests were made and O. D. on spectronic 20 Bausch and Lomb Spectro colorimeter were taken at 500 nm.

Results

The levels of sialic acid in cervical mucus of healthy normals and infertile females were obtained and shown in Table-I.

Carlborg (1969) reported higher sialic acid content in cervical mucus during post ovulatory period. Normally sialic acid is responsible for the rigidity of mucin molecule and therefore strengthens the coherence and consistency of cervical mucus.

This rise in both the important chemical changes and viscosity of the normal fibriller system which plays an important role in sperm penetration affects the fertility.

Thus infertility to some extent could be attributed to varying concentration of sialic acid the estimation of which could prove to be an important diagnostic aid amongst the existing battery of investigations. Further it will undoubtedly aid in the development of agents to control or enhance fertility too.

TABLE I
Mean Values of Sialic Acid in normal and cases of Infertility

Case	No.	Sialic Acid (In $\mu\text{g}/\text{mg}$ of dry mucus)	SD \pm
Normal (Controls)	25	28.4	± 3.35
Infertile (Tests)	50	46.6	± 10.18

$$t = 9.8 \quad df = 68$$

p value—0.001—Highly Significant.

Discussion

The average sialic acid (NANA) in cervical mucus estimated in the present study was 28.4 ± 3.35 $\mu\text{g}/\text{mg}$ at ovulatory period. The normal values reported by Gibbons and Roberts (1963) was 38.0 $\mu\text{g}/\text{mg}$ and by Iacobelle *et al* (1971) was 30.0 $\mu\text{g}/\text{mg}$. The small variation could be due to difference, of methods. The mean sialic acid estimated in dry mucus showed highly significant rise 46.6 ± 10.18 $\mu\text{g}/\text{mg}$ which when statistically analysed gave a highly significant p value of 0.001.

Acknowledgements

Authors are grateful to M/s Sigma Chemicals U.S.A. for supplying us with a sample of N-acetyl neuraminic acid as a gift.

References

1. Carlborg, L.: Acta Endocrinol. (Kobenhaven) 62: 732, 1969.
2. Gibbon, R. A. and Roberts, G. P.: Ann. N.Y. Acad. Sci. 106: 218, 1963.
3. Iacobelli, S.: Fertil. Steril. 22: 727, 1971.
4. Seibert, F. B., Pfaff, M. L. and Seivert, M. V.: Arch Biochemistry, 18: 279, 1948.