

## ROLE OF HYPOPROTEINAEMIA IN ABDOMINAL WOUND DEHISCENCE

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### SUMMARY

During the period of 1991-1992, 500 cases were operated per abdomen, of which 40 had developed dehiscence of wound giving an incidence of 7.97 per cent. Ninety cases undergoing abdominal surgery were studied in details. 50 cases who showed clean and healthy wound comprised "non-dehiscent group" as control group and 40 showing wound gaping comprised "dehiscent group". Hypoproteinaemia and anaemia often co-existed as a manifestation of inadequate nutritional status of 80% of patients who represented the rural folk. Cases operated as emergency admission, showed low level of serum protein affecting the inherent strength of injured tissue and wound dehiscence of varying degree was the post-operative complication. The mean serum protein profile was poorer mainly due to the lowering of albumin fraction and anaemia was found to favour dehiscence.

### INTRODUCTION

Disruption of tissue integrity either by the surgeon's knife or by accidental injury initiates a series of changes at the wound surface. The surgeon's task is therefore, to provide favourable environment and bring proper alignment and leave the rest to "Nature" for successful restoration of tissue integrity. Not that mother nature always succeeds in her task and proper healing occurs, it is then that we are faced with the

problem of "wound dehiscence".

In the process of wound healing the inherent strength of the tissue is one of the most important factor and presence of anaemia, hypoproteinaemia, sepsis play definite role in delaying the process of healing and causing wound disruption of minor or major degree. Partial or complete dehiscence not only increases post-operative morbidity and mortality specially with complete dehiscence, but has an adverse effect on the economy of the patient as well as that of the state.

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Accepted for Publication on 08.09.1993.*

Considering the magnitude of the problem the present study was undertaken with an attempt to co-relate the association of hypoproteinaemia and anaemia in increasing the incidence of wound dehiscence.

**MATERIALS AND METHODS**

The present study was carried out in the Dept. of Obstetrics and Gynaecology, M. L. N. Medical College, Allahabad during the period 1991-92. Of the 500 cases operated either as an emergency or an elective case in obstetrical or gynaecological wards, 90 cases were selected for study purpose. Of these 40 cases had dehiscence of abdominal

wound of varying degrees and comprised the "Dehiscent group" while 50 case of clean and healthy wound comprised "Non-dehiscent group" as control group.

Every case was screened on the basis of a proforma which included detailed history, examination, diagnosis, operation done, post-operative complication, mechanical and stress factors, cortisone therapy prior or during operation, and condition of the wound on removal of sutures were noted.

Laboratory investigations included routine examination of blood, urine, stool, blood sugar and swab culture from the wound.

Table I

Showing the incidence of wound dehiscence

Category of	No. of abdominal operation	No. of cases of dehiscence	Incidence in percentage
Obstetrical	316	26	8.23
Gynaecological	184	14	7.53
Total	500	40	7.97 (8%)

From the above table it was noted that most of the cases belonged to obstetrical category, who registered very late in labour and overall incidence of obstetrical and gynaecological dehiscence cases were 8 per cent.

Table II

Showing comparative serum protein values in two groups

Groups	Mean Total protein gm%	Mean albumin gm%	Mean globulin gm% ratio	Mean A/G
Dehiscent	6.43 ± 0.88	3.19 ± 0.63	3.23 ± 0.9	1.09 ± 0.42
Non-Dehiscent	6.99 ± 0.52	3.99 ± 0.52	2.97 ± 0.53	1.42 ± 0.41

The serum protein values of the two groups were compared in the above table, and it was observed that all the mean values were lower in the dehiscent group as compared to non-dehiscent, except mean globulin value which was higher in group I.



Special biochemical tests viz. total serum protein, serum albumin, globulin and A/G ratio were carried out by Biuret method in the Dept. of Pathology. While elective group of cases had some investigations done pre-operative, most of the emergency obstetric cases which was performed at odd hours, had their investigations done post-operatively and laboratory data were recorded.

#### OBSERVATIONS AND RESULTS

In the study group, a total of 90 patients were closely observed and the observations were represented in tabular form for the two groups - "Dehiscent" and "Non-Dehiscent".

#### DISCUSSION

In the present study the incidence of dehiscence 7.97 (8%) was rather high as com-

Table III

Showing the distribution of cases according to serum albumin level in two groups

Serum albumin value in gm%	Dehiscent group (4)		Non-dehiscent group (50)	
	Number	Percentage	Number	Percentage
Below 3.5	29	72.50	13	26.00
3.5 to 4.5	10	25.00	29	58.00
Above 4.5	1	2.50	8	16.00

In the above table it was noted that 72.5% of cases in the dehiscent group, had serum albumin level below 3.5 gm. percent, while only 26 percent of the cases in non-dehiscent group had the same low albumin value.

Table IV

Showing co-relation between the degree of anaemia and serum protein level in the two groups

Degree of anaemia (Hb. in gm %)	Dehiscent group (40)			Non-dehiscent group (50)		
	No.	%	Mean albumin gm%	No.	%	Mean albumin gm%
Below 7	4	10.00	3.36 ± 0.87	2	4.00	3.47 ± 0.02
7 to 10	22	55.00	3.32 ± 0.51	20	40.00	3.98 ± 0.32
Above 10	14	35.00	3.41 ± 0.8	25	56.00	4.05 ± 0.52

In the above table the degree of anaemia as judged by the concentration of haemoglobin showed that 65% of the cases in the dehiscent group had haemoglobin either below 7 or 7-10 gms, while in the non-dehiscent group only 44% of the cases showed the same level. The serum albumin values were also lower in the dehiscent group in comparison to those of non-dehiscent group.

Table V  
Showing serum albumin values in 2 groups with the nature of operation

Nature of operation	Dehiscent group (40)			Non-dehiscent group (50)		
	No.	%	Mean albumin gm%	No.	%	Mean albumin gm%
Emergency	27	67.50	3.07 ± 0.83	11	22.00	3.97 ± 0.49
Elective	13	32.50	3.25 ± 0.55	39	78.00	4.01 ± 0.53
						Mean A/G ratio
						1.48 ± 0.42
						1.40 ± 0.41

The above table showed that the nature of operations - emergency or elective had a bearing on wound dehiscence, while 67.5% of the cases were emergency, 78% of the cases in non-dehiscent group were elective in nature. Besides the above observations, other host factors viz patients belonging to rural folk or urban, their age, parity, weight, obesity, socio-economic condition, presence of infections, mechanical and stress factors also contributed towards wound gaping.

pared to the figure of Marsh (1954) (5.8%), Mowat and Bonar (1971) (2.3%) and Te-Linde (1977) (0.4 to 3%). The wide variation in the range of incidence was owing to the fact that in the present series all degrees of wound gaping partial or complete were included and 67.5% of the cases in the dehiscent group were of emergency nature, while 78% of the cases of non-dehiscent group were planned operation. Most of the obstetrical emergency cases came from rural areas with poor nutritional reserve and reported late in labour with premature rupture of membrane, prolonged labour, obstructed labour, rupture of uterus and were associated with anaemia, malnutrition, infections which had contributed in increasing the dehiscence rate.

The serum protein values of albumin, globulin and A/G ratio of the two groups of cases showed lowest value than those of non-dehiscent group. The valuation of globulin in the dehiscent group was higher as a result of easy and repeated exposures to the infection causing a rise in gamma-globulin. The lower total protein value in the dehiscent group was mainly due to low level of serum albumin. Hypoproteinaemia was considered when the serum albumin level was below 3.5 gm. per cent and 72.5 per cent of dehiscent cases had hypoproteinaemia in comparison to 26% in the non-dehiscent group. The observation compared well with the work of Koster and Shapiro (1940) whose 86% of the cases with complicated wound had serum albumin below 3.75 gm. per cent while Alexander and Prudden (1966) had albumin values of less than 3 gm. per cent in 53% of the patients with wound disruption.

In table IV the relation of wound dehiscence with anaemia has been depicted and compared with the non-dehiscent group. 65 per cent of the cases showed haemoglobin level below 7 or 7-10 gm.% while of non-dehiscent cases 56% had haemoglobin level above 10 gm.% and the higher was the



haemoglobin percentage and higher was the serum albumin.

Subramaniam et al (1973), Crystal and Chang (1975) noted higher wound infection rate in cases of anaemia which was also in consistence with the present findings.

The relation of hypoproteinaemia to wound infection was first demonstrated experimentally on dog by Thompson et al (1938) and later on demonstrated on human beings by Koster and Shapiro (1940), Wolff (1950), Schiebel and Greech (1953), Alexander and Prudden (1966) and Van Winkle (1968). In their observations, they concluded that hypoalbuminaemia had an adverse effect on wound healing and their cases were associated with high incidence of wound disruption. Anaemia was also a great contributing factor in their cases.

Age, parity, low socio-economic group, infections local or pulmonary and other risk factors viz. mechanical or stress played important role causing wound dehiscence to some extent.

The morbidity rate in the present series was considerable. The average hospital stay of the patient in dehiscence group was 23-26 days, while in non-dehiscence group the average period of stay was only 10-12 days. Mortality rate was low 2.3% even in complete dehiscence or evisceration cases which were very few in the study group. Mann (1962) had reported mortality figure from 18-20%, and Te-Linde (1977) gave an incidence of 15% from the complete disruption and evisceration at the Massachusetts Hospital.

### CONCLUSION

The observation made out of the study establishes the fact that protein deficiency causes delay or disruption of the wound and this finding coincides with Harvey and Howes (1932), Thompson et al (1938), Kobak et al (1947) who concluded that low level of serum albumin is one of the main factors in the causation of wound dehiscence. Van Winkle (1968) mentioned that protein deficiency interfered with epithelialization of the wound. But it has not been possible as yet to isolate specific aminoacids which are crucial to the healing process and to establish the role of "Hypoproteinaemia alone" in the causation of healing wound.

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