SUMMARY & CONCLUSION
The present study on complement system in children with protein-calorie malnutrition was conducted in the Department of Paediatrics, M.I.B. Medical College, Jhansi (U.P.). Thirty two pre-school children (1-5 years age) suffering from protein-calorie malnutrition and twelve age matched well-nourished healthy controls comprised the material for the present study. Complement activity was assessed by three parameters viz. total haemolytic complement \( (CH_{50}) \) activity, alternative pathway activity \( (AP_{50}) \) and serum complement C3 levels. Besides complement activity, various anthropometric measurements (weight, length/height and mid-arm circumference), serum albumin and blood haemoglobin values were noted in each case.

Children suffering from PCM were treated and put on nutritional rehabilitation schedule. An attempt was made to follow the cases at 2 weeks, 4-7 weeks and 10-12 weeks interval.

For the purpose of analysis children suffering from PCM were divided into 3 groups viz. marasmus, marasmic-kwashiorkor and kwashiorkor according to McKerrow classification.

From the data collected means, standard deviations and correlation coefficients were calculated. Means of PCM cases were compared and discussed in relation to controls.
ANTHROPOMETRIC PROFILE:

Anthropometric values viz. weight, length/height and mid-arm circumference in children suffering from PCM were appreciably less than in controls. However, different groups of PCM as per McLaren classification, did not reveal any clear differences.

Following nutritional rehabilitation, mean weight and mid-arm circumference increased consistently during 1st, 2nd and 3rd follow ups in cases of marasmus and marasmic-kaushierker and during the 1st follow up in a single case of kaushierker. However, there was no improvement seen in mean length (height) at subsequent follow ups in all the 3 groups of PCM, exception being a single case of kaushierker.

SERUM ALBUMIN VALUES:

Mean serum albumin level (3.12 ± 0.30 gm/dl) was found to be significantly depressed in PCM as compared to the controls (4.06 ± 0.27 gm/dl).

Mean serum albumin levels (gm/dl) in marasmus, marasmic-kaushierker and kaushierker were 3.49 ± 0.53, 3.78 ± 0.41 and 3.08 ± 1.62. These values were significantly lower than those of controls. Value was lowest in cases suffering from kaushierker.

Following nutritional rehabilitation there was increase in mean serum albumin levels in all 3 PCM groups.

Hемоглобин VALUES:

Mean haemoglobin level was significantly lower in PCM cases (7.82 ± 1.63 gm/dl) as compared to controls (12.87 ± 1.04 gm/dl).
Mean haemoglobin values (gm/dl) i.e. 8.62 ± 1.14, 6.96 ± 1.60 and 5.60 ± 0.83 in marasmus, marasmic-kwashiorkor and kwashiorkor, being lowest in last group, were also significantly lower as compared to controls.

During follow up, as with serum albumin levels, there was a definite rise in mean haemoglobin value in each of the 3 groups of PCM.

**COMPLEMENT ACTIVITY:**

**Total Haemolytic Complement (CH₅₀) Activity**:

Mean CH₅₀ value (U/ml) in PCM cases (5.59 ± 3.43) was not significantly different from controls (7.16 ± 1.92).

Mean CH₅₀ values (U/ml) in marasmus, marasmic-kwashiorkor and kwashiorkor were found to be 5.51 ± 3.85, 5.77 ± 2.70 and 5.49 ± 3.96 respectively. These values were not significantly different from the controls. Also, the group differences of mean CH₅₀ values were not appreciably different.

During follow up there was no constant pattern of rise or decline in mean CH₅₀ values in marasmus and marasmic-kwashiorkor cases. However, in single case of kwashiorkor followed only once, there was an increase in CH₅₀ value by 2.58 U/ml.

**Alternative Pathway Activity (AP₅₀):**

Mean AP₅₀ value (U/ml) in PCM cases (64.88 ± 33.07) was not significantly different from controls (64.70 ± 10.11).
Mean AP₅₀ values (U/ml) in 3 group of PCM viz. marasmus, marasmic-kwashiorkor and kwashiorkor were found to be 63.82 ± 24.91, 62.32 ± 22.53 and 51.40 ± 3.90 respectively. Out of all these values, mean value in kwashiorkor group was significantly lower as compared to controls. However, there were no significant differences of AP₅₀ means within the PCM groups.

During follow up periods, there was no constant difference in repeat AP₅₀ values in marasmus and marasmic-kwashiorkor. However, in a single case of kwashiorkor value decreased from 47.12 U/ml to 45.00 U/ml after 1st follow up.

Complement C₃ Values:

Mean complement C₃ values in children suffering from PCM (60.89 ± 23.25 mg/dl) was significantly lower as compared to controls (125.83 ± 23.98 mg/dl).

Mean C₃ values (mg/dl) in marasmus, marasmic-kwashiorkor and kwashiorkor groups were found to be 63.16 ± 23.98, 68.30 ± 23.88 and 36.67 ± 2.31 respectively. These values were significantly lower as compared to controls. However, mean values in 3 groups were not significantly different from each other.

In children suffering from marasmus mean C₃ values rose consistently even above control levels, after 1st and 2nd follow up. In a single case, followed 3rd time, a rise from 88.00 mg/dl to 114 mg/dl noticed.
During follow up in sarcoidosis-kwashiorkor cases, though C3 values attained a significantly higher levels, there was no consistent rising pattern.

In kwashiorkor group, a rise of 52.00 mg/dl in C3 value was observed in 2 weeks time in a single case followed.

**Correlation of different parameters with complement activity:**

**Age with complement activity:**

No definite trend of rise or decline was seen in complement values viz. CH50, AP50 and C3 in relation to age.

**Height (expressed as % of 50th percentile of Harvard standard) with complement activity:**

No definite trend of rise or decline was seen in CH50 and AP50 values in relation to height percentage.

However, a significant positive correlation ($r = 0.685$) was observed between weight percentage and C3 values.

**Length/Height (expressed as % of 50th percentile of Harvard standard) with complement activity:**

There was non-significant correlation seen between percentage length (height) and CH50 as well as AP50 values.

However, a positive significant correlation ($r = 0.686$) was seen between length percentage and C3 values.

**Mid-arm circumference with complement activity:**

No definite trend of rise or decline was seen in CH50 and AP50 values in relation to mid-arm circumference.

However, there was positive significant correlation ($r = 0.721$) between mid-arm circumference and C3 values.
Serum Albumin Values with Complement Activity:

Correlation coefficients (r) of serum albumin with CH50 and C3 values were 0.299 and 0.823 respectively, being significant. However, there was no significant correlation between serum albumin and AP50 values.

Haemoglobin Values with Complement Activity:

There was no definite rising or declining trend in CH50 and AP50 values in relation to haemoglobin values. However, there was a significant positive correlation (r = 0.628) between haemoglobin and C3 values.

Correlation among CH50, AP50 and Complement C3 Values:

A positive significant correlation (r = 0.345) was observed between CH50 and C3 values. However, no significant correlation was found between CH50 and AP50, as well as between C3 and AP50 values.

Complement Activity and Infection:

Since all control cases were free from infection and every PCW case had one or the other type of infection, we could not predict the effect of infection on the complement activity.

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