

Anaesthetic Problems In Plastic Surgery†

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THOUGH plastic surgery has been practised since ages, but recent scope of the plastic surgery in varied type of patients, and in combination with different surgical and other specialities has opened new horizons and with it manifold problems.

The benefit of the plastic surgery is being made possible with advancement of anaesthesia and other aids like transfusion, biochemistry etc. The challenge of providing anaesthesia to many complicated cases and keeping the patient under anaesthesia for many long hours in each sitting, has been a special demand.

It is since 1959 that the department of the plastic surgery was established formally at Rajendra Hospital, Patiala. The experience of these few years have unfolded many problems and challenges so as to find answers to them.

Table No. 1 gives the number of operations performed in six years.

Table—1
Showing the Plastic Surgery Operations in six years

Year	Number of operations Performed
1959	38
1960	146
1961	233
1962	334
1963	440
1964	451
1965 (upto 31 July)	282

To consider few problems like nutrition, shock; repeated operations; prolonged hours of surgery, infection, problems of airway; suitable and safe anaesthetic agents and techniques, and psychological upsets; this paper has been presented both to exchange the information and benefit from each other.

General Nutritional Status

Generally speaking, the plastic surgery patients with better nutrition stand the stress of operation and anaesthesia with less morbidity. Safety of the surgical operation is more, and the period of convalescence is shortened in better nourished plastic surgery patients.

Protein Deficiency

Protein deficiency is quite common in the plastic surgery patients due to several factors like socio-economic conditions ill balanced diet, burns, infections, and other concomitant diseases.

This is first manifested by fall in the serum albumin concentration. The first effect is the reduction of the amount of proteins stored in the body tissues. These patients are also under-weight.

The serum proteins studies in series of cases were done which shows average serum proteins in an average case as 5.0 to 6.0 gms%, which is low as compared to the normal quoted by Kumar et al (1957) to be 7.08—7.79 gms%.

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Table—2
Serum Proteins in three groups of
cases in a series of 28 cases

(Grouping according to the level of serum proteins)

Group	Level of serum proteins gms%	Number of cases
I	7.0 to 8.0	1
II	6.0 to 6.9	5
III	5.0 to 5.9	22
Total		28

Anaemia and Hypo-Proteinaemia

Anaemia and hypo-proteinaemia co-exist. When these conditions occur simultaneously it is important that the patient be provided adequate protein and iron for haemoglobin synthesis, an additional amount for the protein storage and the plasma protein regeneration. If this is not done, the haemoglobin regeneration will take place at the expense of the plasma storage and the plasma protein (Ravdin 1946).

Comparative Haemoglobin, Serum/Proteins and Weight Study

Studies of pre-operative haemoglobin, and the pre-operative serum proteins and the weight were carried out in a series of cases. Their respective levels confirmed the observation made above, and particularly it was seen that the burn cases had much lower levels as compared to other plastic surgery cases. Comparative protein studies of cases of burn contractures, rhinoplasties, dermabrasions give the required information, and are tabulated below. (Tables 3—7).

Table—3
Nutritional Status of cases of post
burn contractures

Case No.	Pre operative Haemoglobin gms%	Pre-operative serum Proteins gms%	Weight in Kg.
6	12.0	6.8	Under weight—14
12	12.0	5.9	„ „ — 5
13	15.0	5.9	„ „ —14
14	12.5	5.6	„ „ —10
15	12.0	5.5	„ „ —13
17 i	11.0	5.3	„ „ — 1
ii	11.0	5.3	Gain „ —1.5
27	12.5	5.9	Under weight - 1
28 i	13.0	5.5	„ „ —11
ii	13.0	6.3	„ „ —12

In other group of cases of post burn contractures, low serum proteins levels were observed in all the cases, and low haemoglobin levels were observed in more than 60% of the cases.

Table—4
Haemoglobin and serum proteins levels
of 40 cases of post burn contractures

Number of cases	Haemoglobin gms%	Serum Proteins gms%
19	Below 10.0	4.4
14	10.5 to 12.0	5.5
7	12.5 to 14.0	5.3
Total 40		

Age group and sex study

The age group of the post burn contracture cases, as tabulated below, reveals that more than 50% of these cases are children; this study shows predominance of the males.

Table—5**Age group and sex study of cases of post burn contractures**

Age group in years	Number	Male	Female
6/12 to 6	13	9	4
6½ to 12	14	6	8
13 to 25	9	5	4
26 to 50	4	2	2
Total	40	22	18

Plastic Surgery in Dermabrasion cases

These dermabrasion should have adequate pre-operative haemoglobin levels. Haemoglobin levels of about 11.0 to 12.0 gms per cent is preferable.

The staging of the plastic surgery operations may have to be considered, since the patients would develop negative nitrogen balance post-operatively due to exudation of the serum from the site of the operation, and this may be quite a big amount.

Besides opening of the mouth, and the feeding of the patient becomes difficult, if the operation on whole of the face is done in one sitting.

Table No. 6 gives the pre-operative haemoglobin levels and the serum proteins levels, and the weight study in these dermabrasion cases.

Table—6**Nutritional status of cases of****dermabrasion**

Case No.	Pre-operative haemoglobin gms%	Pre-operative serum proteins gms%	Weight in Kg
7	12.5	5.9	Under weight—4
8	11.0	5.7	„ „ —1.5
9	10.0	5.5	„ „ —4.5
10	11.0	5.9	„ „ —1

Plastic Surgery in Rhinoplasty cases

Rhinoplasty cases should have adequate haemoglobin since the formation of the tube from the scalp may involve considerable loss, this may need replacement by adequate blood transfusion.

Table No. 7 gives the pre-operative haemoglobin levels, the serum proteins levels, and the weight study in rhinoplasty cases.

Table—7**Showing the nutritional status of cases of Rhinoplasty**

Case No.	Pre-operative haemoglobin gms%	Pre-operative serum proteins gms%	Weight in Kg.
2	13.0	5.8	Normal Wt.
3	14.0	8.0	„ „
4	13.5	6.5	Under weight—6
5 i	13.0	6.3	„ „ —8
ii	9.5	5.8	„ „ —9
iii	11.5	5.5	„ „ —11
20	12.0	6.3	„ „ —3
21	10.0	5.5	„ „ —2.5

Case report of case No. 5

CR 62197 H.S. Age 17 years was admitted on 18.12.63. He had deformity nose

after leishmaniac ulcer. He was operated on 28.12.63. Duration of operation and anaesthesia lasted for $3\frac{1}{4}$ hours. During the operation the patient was given one bottle of 5% glucose, and one unit of blood was given in the post operative period.

In spite of the supportive therapy, the patient's haemoglobin level came down to 9.5 gms%, and the serum proteins level dropped to 5.8 gms%. The pre-operative haemoglobin level was 13.0 gms%, and the serum proteins level was 6.3 gms%.

Nitrogen Balance

Nitrogen balance is important in protein nutrition. By means of nitrogen balance only, can it be known whether the protein is being stored in the body or lost from the body. In positive balance, the nitrogen intake exceeds the nitrogen loss from the body. In the negative balance, the nitrogen output exceeds the nitrogen intake.

The positive nitrogen balance is achieved when the diet is adequate in amount, protein, and the total calories. The nitrogen balance on a low protein diet and adequate carbohydrates diet may be achieved, but such a dietary is not safe.

Every operation, injury, infection is associated with a period of increased catabolism resulting in most cases a negative nitrogen balance and is known as "Metabolic Response" (Cuthbertson 1959; Moore 1959).

A protein deficiency exists in many instances prior to operation, protein catabolism brought by operation may induce it or intensify the protein deficiency. This is all the more true when a extensive tissue trauma leads to exudation or when the

infection supervenes.

Infection still continues wherever malnutrition prevails.

Repeated Operations

Repeated operations are very often necessary in the plastic surgery repair procedures. Often the operation and anaesthesia is prolonged beyond two hours and may last up to $5\frac{1}{2}$ hours. The changes produced in the nutritional status of the plastic surgery operations, performed in one sitting as well as several sittings, were studied in the series of 28 patients.

In one patient of the series (case no. 5i) operation and anaesthesia lasting $3\frac{1}{4}$ hours lowered the haemoglobin level from 13.0 to 9.5 gms %, the serum proteins level from 6.3 to 5.8 gms%, loss of weight occurred to the extent of 1 Kg.

After the second operation of three hours duration performed under a general anaesthesia, the serum proteins level was further lowered from 5.8 to 5.5 gms%. However the haemoglobin level improved from 9.5 to 11.5 gms% with a blood transfusion, loss of weight occurred to the extent of 2 Kgs.

Effect of Growth Hormone

The metabolic response is influenced by the growth hormone in case of children, who may show a anabolic response after operation and anaesthesia (Oslo 1957) as shown by the gain in weight of 2.5 Kgs. in case no. 17 ii in Table No. 3.

Weight Studies

Three children and four adults were found to possess normal weight in the series of 28 patients, one child was one over-weight. Rest of the patients were

under weight by 6 to 15 Kgs.

Nitrogen Metabolism Charts

Nitrogen metabolism studies were carried out in a series of 28 patients subjected to various plastic surgery operations under different anaesthetic techniques. One case of rhinoplasty was done in three stages (Case No. 5), while two cases of post burn contractures were done in two stages each

Table 8 shows the different types of anaesthesia used in this series of 28 patients.

Table 8 Showing the Different types of Anaesthetic Techniques in the Series of 28 Patients.

Type of Anaesthesia	Number of operations
General anaesthesia	27
Spinal anaesthesia	3
Local anaesthesia	2

Two types of responses were seen in this series of 28 patients;

- (a) Low Nitrogen response
- (b) High Nitrogen response

The nitrogen intake in food was about 10 gms in all adult patients. When the nitrogen excretion was 7 gms or less, it was low nitrogen response. When the nitrogen output was more than 7 gms, it was high nitrogen response.

It is presumed that the patients with low nitrogen response had low reserves of protein in the body, and therefore have a tendency to conserve nitrogen (Abbot 1959; Cuthbertson 1959) whereas the patients with high nitrogen response probably had adequate reserves of the proteins in the body.

In plastic surgery procedures, the patients showed an early return to a posi-

tive nitrogen balance with little relationship with the duration of anaesthesia. The late positive nitrogen balance response in some cases was probably due to extreme tissue destruction (for example in case of elephantiasis of both legs; case no. 25; and contracture axilla case no. 13).

Table 9 shows the metabolic response of return to positive balance in plastic surgery cases and its relationship with the type of anaesthesia.

Table 9 Showing the Metabolic Response of Return to Positive Balance in Plastic Surgery cases, its Relationship with the type of Anaesthesia.

Type of Anaesthesia	Number of operations	Post operative day of return to positive nitrogen Balance
General	27	Second to Fifth
Spinal	3	Second to Fifth
Local	2	First

Problems of Airway

In cases of contracture neck, ankylosis jaw, cancrum oris; there is difficulty in opening of the mouth. Laryngoscopy in such cases is very difficult. Nasal intubation by the blind method (Wolfson 1962) is the the only choice left for maintaining the airway patent during anaesthesia ; in certain number of cases due to contracture of neck the trachea is shifted also, nasal intubation is made most difficult. Under local blocks the release of contracture can be done; and when the opening of the mouth is possible, oral intubation can be done.

Tracheostomy

Tracheostomy may have to be considered, if nasal intubation dose not succeed.

This procedure, however, is to be avoided in plastic surgery cases especially contracture neck cases, which is the region of operation, both from the point of view tracheostomy and resultant infection, secretions, and scar which is inevitable.

Composite Photograph

In order to facilitate the nasal intubation which by reason of contracture neck alignment is defective, composite photograph was thought over; this gives a fair idea of the air passages, and the nasal intubation can be attempted. More studies on this technique are to be carried out to standardise the technique and overcome the initial difficulties,

Airway in Cleft Palate Cases

Children with cleft palate offer some difficulty during laryngoscopy/intubation. Due to the cleft palate, there is less tissue support and laryngoscopy becomes difficult. The position of the endotracheal tube and the compression of the tube with the tongue blade of the gag or the kinking of the endotracheal tube during the operation are the problems to be tackled.

An attempt by a local modification of the Kilner modification of Dott gag has been tried in which the endotracheal tube is threaded through the tongue blade, and the sliding mechanism is separated which can later be fitted with the handle of the tongue blade without interfering with the position of the endotracheal tube. The mouth can be kept open without pressure on the endotracheal tube. The tube is brought out directly in the midline of the tongue blade. The conventional flexo-metallic endotracheal

tube or passage of the tube through the Magill's connection have been tried which do show at times kink and danger of slipping out of the endotracheal tube. In children, the epiglottis is relatively bigger, it makes an angle of 45° with the anterior pharyngeal wall. The glottis is placed higher up. The rima glottidis is opposite the third-fourth cervical interspace in the children, in adults it is one interspace lower. The narrowest part of the larynx may be at the level of the cricoid cartilage, which is not distensible, as the vocal cords. Thus an endotracheal tube may be squeezed through the glottis, but may be held up at the cricoid cartilage, causing the trauma and laryngeal oedema. According to Kohli (1957) to avoid oedema, the widest bore endotracheal tube which can pass through the cricoid level without the use of any force should be passed.

Problem of Airway in Macroglossia

For maintenance of airway, in cases of macroglossia, intubation by nasal route is desirable, to prevent aspiration of blood in the tracheo-bronchial tree.

Burn Cases

The burn cases usually have a low nutritional status, low serum proteins levels and low haemoglobin values. (Tables No. 3 & 4) As such they do not stand well the stress of the operation and anaesthesia.

Further the presence of infection, temperature debilitates these patients, They usually run a high temperature due to infection. Pulse rate is rapid, more than 140/min. and the cardio-vascular system is already working under the stress