Hypotensive anaesthesia in Surgery of oral cancer

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OPERATIONS for oral cancer are always accompanied with haemorrhage and many a time blood loss is so profound as to endanger the life of the patient inspite of all possible measures to treat it. Too much blood transfusion which is frequently needed during the operation, carries its own hazards. Besides persistent blood loss makes the operation messy, time consuming and less precise.

For many years surgeons have contented with local haemostasis till Gardner (1946) introduced controlled hypotension by arteriotomy in human patients.

There are many methods of achieving a state of controlled hypotension. Ganglionic blockade by trimetaphan is a popular technique. But trimetaphan (Arfoned) is very expensive and is not available in our country. Sodium nitroprusside can be used for deliberate hypotension. But the method is still under trial and the drug is not yet marketed in readily available form.

Griffiths and Gillies (1948) introduced total spinal block for hypotension as a method of providing a bloodless operative field. This method has little following and is seldom used.

Spinal block along with a general anaesthesia may be useful in producing a bloodless operative field for oral surgery. This technique is very simple and cheap and can be employed in most centres of our country.

In the present study, an attempt has been made to observe the effects of deliberate hypotension with spinal block during anaesthesia for surgery of oral cancer. The efficacy of the technique in diminishing blood loss, providing a bloodless field as an aid to precise dissection and in reducing operating time, has been assessed. Deliberate hypotension unless properly managed has its own risks in producing ischaemia and or hypoxia of the vital organs like brain, heart and kidneys. Hence the study includes a critical analysis of cerebral, renal and myocardial functions assessed both during or after the period of deliberate hypotension.

Subjects and methods :

Ten patients with oral carcinoma of both sexes were studied. The age of the patients varied from 35 to 60 years, average being 46.6 years. Of these 10 cases, 7 patients were male and the remaining three were female. 7 patients suffered from carcinoma cheek and required hemimandibulectomy and the rest suffered from carcinoma of the lip, in which only local excision was necessary. Preoperative assessment was carefully carried

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out on the patient. General check up was combined with a study of the cardiovascular system and renal function. Preoperative eletrocardiograms were taken. Renal function tests like urinary output, urinary urea, blood urea and renal excretory index were recorded. Renal excretory index is taken as the standard renal function test and is calculated from the following formula :

$$\text{R E.I.} = \frac{\text{Urinary urea mg \%}}{\text{Blood urea mg \%}} \times \frac{\text{24 hrs. urine volume (ml)}}{100}$$

The lower limit of normal for renal excretory index is 84. A value between 84 and 200 may raise suspicion of renal insufficiency, in which case the patient should receive extra attention. A value of more than 200 indicates normal renal function.

All the patients received intramuscular injection of Pethidine and Phenargan as premedicant drugs, one hour before the operation, Atropine was omitted as the consequent tachycardia may prevent the onset of hypotension.

Firstly a spinal block was given through the interspace between L_1 and L_2 vertebrore by injecting 1.2 to 1.5 ml. of 5% lignocaine intrathecally. The patient was then made supine and general anaesthesia was administarted. Induction of anaesthesia was done with Thiopentone and Tubocurarine. Nasotracheal intubation with throat pack was used. Anaesthesia was maintained with nitrous oxide, oxygen and intermittent doses of pethidine and tubocurarine with controlled ventilation. Slight head up tilt was used in all cases. Blood pressure and pulse rate were recorded at frequent intervals. The electrocardiograph was attached to the patient and a standard lead II was recorded every 2-5 minutes to detect any incidence of myocardial ischaemia. An intravenous infusion of 5% dextrose solution was started from the very beginning but the rate was kept very slow.

When blood pressure came down to 60 mm Hg. (Systolic) the surgeon was asked to start the operation. When the bleeding part of the surgery was completed, the table was made horizontal and infustion rate was increased to bring the blood pressure towards normal, so that the surgeon was able to detect and catch the bleeding vessels for accurate haemostasis. The patients were completely decurarised before sending them to the wards.

Postoperatively renal function tests were repeated to detect any renal damage. Mental efficiency was evaluated clinically to detect any abnormality by asking suitable questions and observing behaviour patterns.

Results :

In this series of 10 cases effective and satisfactory hypotension could be achieved on 9 occasions. In one case failure was recorded probably because of a low dosage of the spinal anaesthetic (0.8cc. 5% Xylocaine).

In the preoperative period the average blood pressure was 148/90 mm Hg ranging from 120/90 to 185/95 mm. Hg. Preoperative electrocardiograms showed no gross abnormality or irregularity.

The average time taken to come to a steady level of blood pressure (60-80mm. Hg. systolic) when the surgeon could be allowed to start the operation was 16 minutes (range

10 to 25 minutes).

The blood pressure remained between 60 to 80 mm. Hg. for an average of 33 minutes (ranging from 20 to 45 minutes). A plea can be made for surgery specially the part attended with maximum bleeding be completed as quickly as possible to allow maximum benefit to the patient.

This is a preliminary study. Accurate blood loss could not be measured. However a clinical estimation was attempted both by the anaesthesiologist and the surgeon. This was helped by using a minimum number of dry mops during the operation and weighing them before and after use. In our assessment the blood loss varied from 100-150 cc. during the entire procedure.

Table shows the results of renal function tests done preoperatively and postoperatively. There was no obvious renal disturbance in these cases.

Serial electrocardiograms specially during the hypotensive phase, showed no signs of myocardial ischaemea in this series.

Table :

Renal function before and after hypotensive spinal anaesthesia.

	Preoperative	Ist. post. op. day
Urine volume (ml.)	1534 (1200—2000)	1483 (900 - 2000)
Urinary urea mg %	673 (256 — 1187)	782 (281—1250)
Blood urea mg %	24 (17 — 34)	34 (20—60)
R. E. I.	400 (202 — 643)	415 (210 - 1000)

figures within bracket indicate range.

All these patient were examined on the post-operative day and then subsequently in respect of memory, intelligence etc. The tests showed that these functions remained normal.

Discussion :

We have attempted to find out the effectivity of a simple, cheap and easily applicable method for production of deliberate hypotension, in operations where blood loss is expected to be considerable. With this end in view we have used a technique of subarachnoid spinal block with lignocaine (Xylocaine heavy) with the idea of producing extensive efferent sympathetic neural block to achieve vasodilatation in the affected area, which in turn produces relative hypovolaemea—diminished venous return - diminished cardiac output accompanied by lowered peripheral resistance. All these factors lead to arterial hypotension. In addition, the advantage of head uptilt was utilised to get an almost bloodless operation field. All these operations on the face required endotracheal anaesthesia and adequate ventilation. The use of a muscle relaxant was found essential for this purpose. We have taken the help of tubocurarine which besides producing muscular relaxation, has a limited ganglion blocking effect.

The results show that very effective and predictable degree of hypotension could be achieved with spinal subarachnoid block. The systolic blood pressure came down to a steady level of 60-80 mm. Hg. within the period of 15 minutes following induction and remained at that level for about half an hour. Hence the induction time and duration of its

action was found quite consistant with the surgical procedure. This covered the period of excisional surgery which is attended with maximum blood loss. The gradual rise in blood pressure thereafter helped visualise the main bleeding points which were adequately secured and tied.

In the majority of cases the blood loss was limited to 100-150 ml. and this could then be replaced by transfusing whole blood towards the end of the operation. No adverse effects were noticed on the cerebral, myocardial and renal functions.

Deliberate hypotension by this technique appears to be safe, satisfactory, predictable, easily reversible and efficient. Lignocaine is the main drug used which is manufactured and marketed economically in this country. This technique should prove suitable for Indian conditions and can be practised with advantage at most surgical centres.

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