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Experience with hypotensive anaesthesia in a peripheral General Hospital

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Summary

Twenty patients undergoing various surgical procedures were anaesthetised using hypotensive anaesthesia using labetelol and halothane. The technique is safe, predictable and cheap. This technique also offers the advantage of usage of less blood, thus minimising the complications of transfusion induced diseases like hepatitis and AIDS.

Key words: Induced hypotensive anaesthesia, Labetalol.

Introduction

The aim of induced hypotension in anaesthesia is to reduce bleeding during surgery. Hypotensive anaesthesia has been practised for many years. Various methods like spinal analgesia and drugs like ganglion blockers were used for hypotensive anaesthesia. In the hands of a competent anaesthesiologist and good surgeon who is an expert in operating under hypotensive anaesthesia, this technique will enable the surgeon, to a better identification of the pathology and thus a good resection. This will also decrease blood loss and so the usage of blood is minimised. Blood is difficult to obtain. More over, with prevalence of hepatitis B infection with carrier rates ranging from 3–11%,[1] it is better for the patient if one can avoid transfusion. All of these are of great benefit to the patient. These benefits should encourage many anaesthesiologists and surgeons to practice this technique. This paper is presented to share our experiences of controlled hypotensive anaesthesia in a peripheral general hospital in Kelantan using halothane and labetelol in 20 patients undergoing a variety of operations including E.N.T., orthopaedic and general surgical procedures.

Patients and Clinical Management

Hypotensive anaesthesia was selected for those patients to whom the bleeding was expected to be heavy. The type of operations done are shown in Table 1. All patients were assessed pre-operatively for fitness for anaesthesia and only those in ASA I were included in this study. Twenty patients, ranging in age from 11 to 57 years. There were nine males and 11 females; the average weight of the males was 50 kg. and the average weight of females was 45 kg. All patients were premedicated with pethidine, atropine and dimenhydrinate given intramuscular one hour before the operation. On arrival at the operation theatre, B.P., ECG, pulse were recorded and induced with sodium thiopentone 4 mg. per kg. given intravenously. All patients except six were intubated using pancuronium 0.1 mg. per kg. The six patients undergoing urological procedures were intubated using atracurium 0.6 mg. per kg. Intra operative analgesia was maintained with pethidine 1 mg. per kg. given I.V. at induction. Initially patients were hand ventilated and later ventilation maintained with a Manley Ventilator using N_2O/O_2 in the ratio 70:30 and halothane 1–1.5 volume percent. The following parameters were monitored; blood

Table 1
The types of operations done under controlled hypotensive anaesthesia using halothane and labetelol

Number	Age	Sex	Diagnosis	Operations Done
1.	50	F	Mixed Parotid Tumour	Excision
2.	16	M	Angio Fibroma	Trans Palatal Excision
3.	26	M	Fracture Femur	Plating Femur
4.	52	F	Staghorn Calculus	Pyelolithotomy
5.	43	M	Fracture Shaft Femur	Plating Femur
6.	34	F	Toxic Goitre (Thyroid)	Thyroidectomy
7.	11	M	Angio Fibroma	Trans Palatal Resection
8.	35	F	Toxic Goitre	Thyroidectomy
9.	26	M	Fracture Shaft Femur	Plating Femur
10.	48	F	Toxic Goitre	Thyroidectomy
11.	19	M	Fracture Shaft Femur	Plating Femur
12.	53	F	Renal Calculus	Nephrolithotomy
13.	54	F	Ca. Rectum	A.P. Resection
14.	57	F	Staghorn Calculus	Nephrolithotomy
15.	50	M	Hypernephroma	Nephrectomy
16.	39	F	Recticulum Cell Sarcoma	Lat. Rhinotomy
17.	43	F	Ca. Breast	Simple Mastectomy
18.	47	M	Staghorn Calculus	Nephrectomy
19.	45	F	Ca. Breast	Modified Simple Mastectomy
20.	51	M	Nephrolithiasis with non-Functioning Kidney	Nephrectomy

pressure (using oscillating tonometer), pulse rate, ECG, FIO_2, CVP and urinary output. Once the patients were positioned, labetelol 0.5 mg. per kg. was given. The pulse rate and blood pressure were monitored.

The desired systolic blood pressure was achieved by adjusting volume percent of halothane. Subsequent dose of labetelol in increments of 5 mg. was given I.V. only if there was tachycardia or an inability to lower the systolic blood pressure with 2 volume percent halothane. Throughout the operation systolic blood pressure was maintained at 80–70 mmHg. The volume percent of halothane never exceeded two at any time during this study. Before the closure, systolic blood pressure was raised to 100 mmHg. This was obtained by turning off halothane and intravenous atropine sulphate 1 mg. followed by calcium chloride 5–10 mmg. per kg. The patients were reversed the usual way using atropine and neostigmine. Post operatively, patients were closely observed for blood pressure, pulse rate for signs of bleeding and urinary output.

Results

The pulse rate and systolic blood pressure dropped 5–10 minutes after the labetelol – (Figure 1). The pulse rate remained around 80–90 beats per minute, close to the preoperative level. The systolic blood pressure was maintained around 70–80 mmHg. The drop in systolic blood pressure was much more than the drop in pulse rate. There was not much change in the central venous pressure. The urine output during the operative procedure was satisfactory. The E.C.G. showed nodal rhythm in one case, which reverted to sinus rhythm at the end of the procedure – Beta blockade. To illustrate the results, three separate cases were presented below in Figures 2, 3 and 4.

Case One (Figure 2): A 16 year old Vietnamese boy underwent transpalatal resection of angio fibroma. As shown in Figure 2, the blood pressure was raised soon after induction and intubation, then it fell following labetelol. The pulse rate dropped to 90 beats per minute which was closer to the preoperative pulse rate of 90 beats per minute. The hypotensive effect was successfully reversed by atropine and calcium. This patient had a high pulse rate throughout the operation. the operation.

Case Two (Figure 3): A 43 years old Malay male underwent plating of the fractured femur. Here too, the pulse and blood pressure went up slightly on intubation but came down soon after labetelol. The pulse rate remained around 80 beats per minute.

Case Three (Figure 4): A 35 year old Chinese female underwent thyroidectomy. Her fall in blood pressure was rapid. The pulse rate remained low around 70 throughout the operation.

In all three patients we did not have any problem in bringing up the blood pressure at the end. There was no excessive post-operative bleeding; the urinary output was satisfactory. Post operative recovery was uneventful. The patients were discharged well.

Discussion

Hypotensive anaesthesia is induced to create a relatively bloodless operating field for surgery. It is a controversial subject. Some believe in it and use it to a varying degree but on the other hand some feel that it is dangerous and should be avoided at all costs.[2] Few surgeons enjoy operating in a bloody field, and surgeons may waste much of their valuable time or even much of their nervous energy in catching bleeding points. Hypotensive anaesthesia produces a dry surgical field. This enables the surgeon to identify tissues easily, thus making resection and reconstructive procedures much easier. There are many techniques available and no clear evidence that any one technique is superior. Spinal and epidural analgesia can produce good analgesia and a relatively dry operative field for lower half of the body. Some procedures on the limbs could be carried out using a tourniquet. Ganglion blockers; halothane alone or in combinations with ganglion blockers have been used. Halothane in 3 percent volume concentration when used in combination with labetelol resulted in reduction of mean arterial pressure, cardiac output and an increase in central venous pressure.[3] Sodium nitroprusside is a powerful vasodilator and a potent hypotensive agent with immediate action. The infusion rate has to be monitored very carefully and one must preferably be able to monitor the systolic pressure using intra arterial pressure lines. These are not easily available and moreover puts more demands on the sole consultant anaesthesiologist in the peripheral hospitals. Thus one has to look for safer and simpler techniques. Sodium nitroprusside is also associated with problems of metabolic acidosis and tachycardia.[4] Thus one should monitor infusion rate and blood levels which are again outside the realm of most General Hospitals.

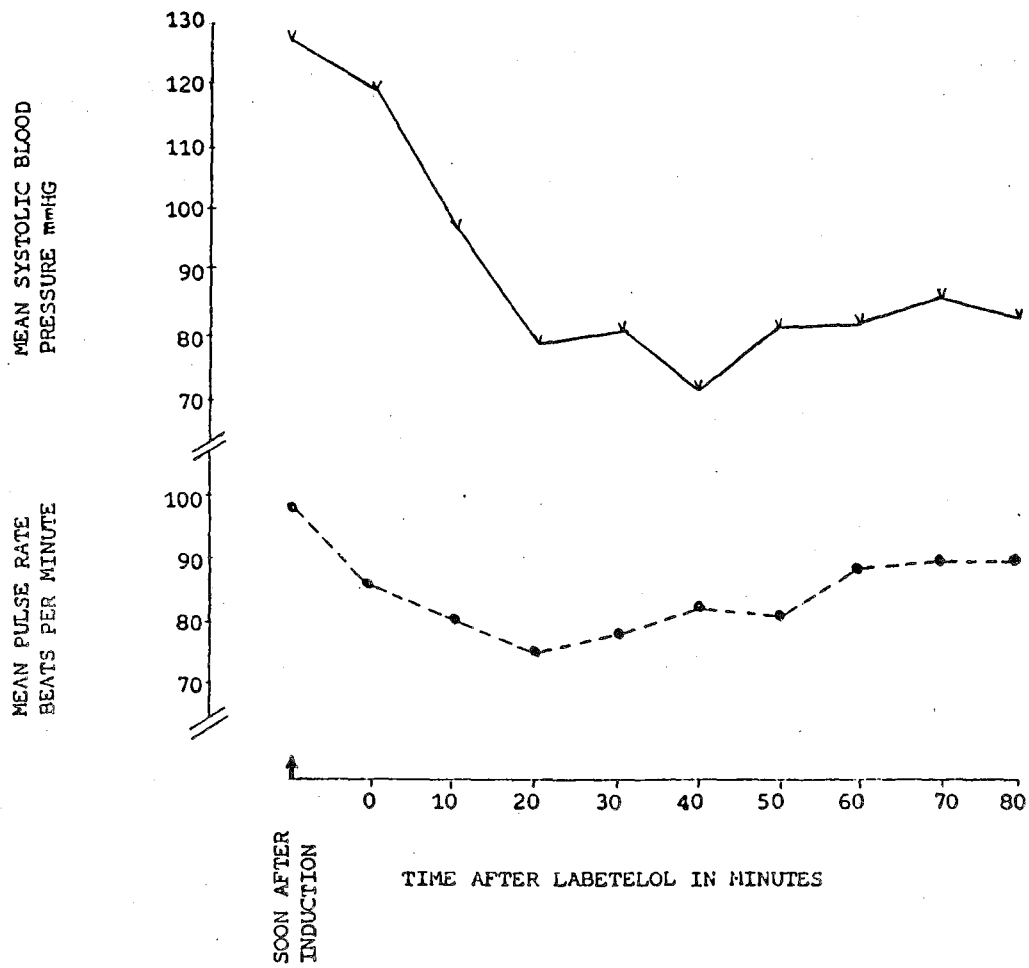
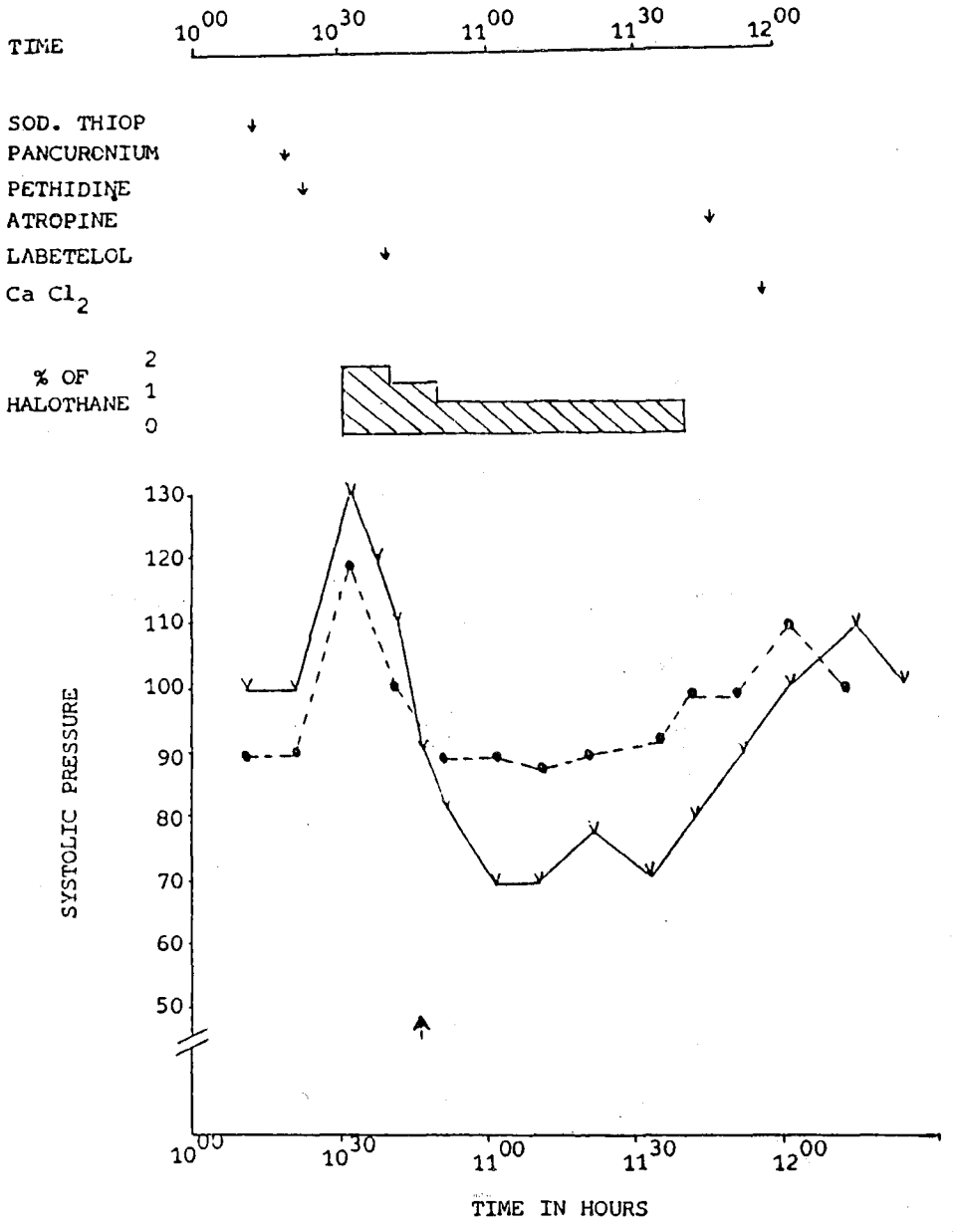


Figure 1. The effect of labetelol on blood pressure and pulse rate on anaesthetised patient



INDEX:

v SYSTOLIC BLOOD PRESSURE IN mmHG
• PULSE RATE BEATS PER MINUTE
↑ BEGINNING OF OPERATION

Figure 2. Angiofibroma – trans-palatal resection. Age: 16

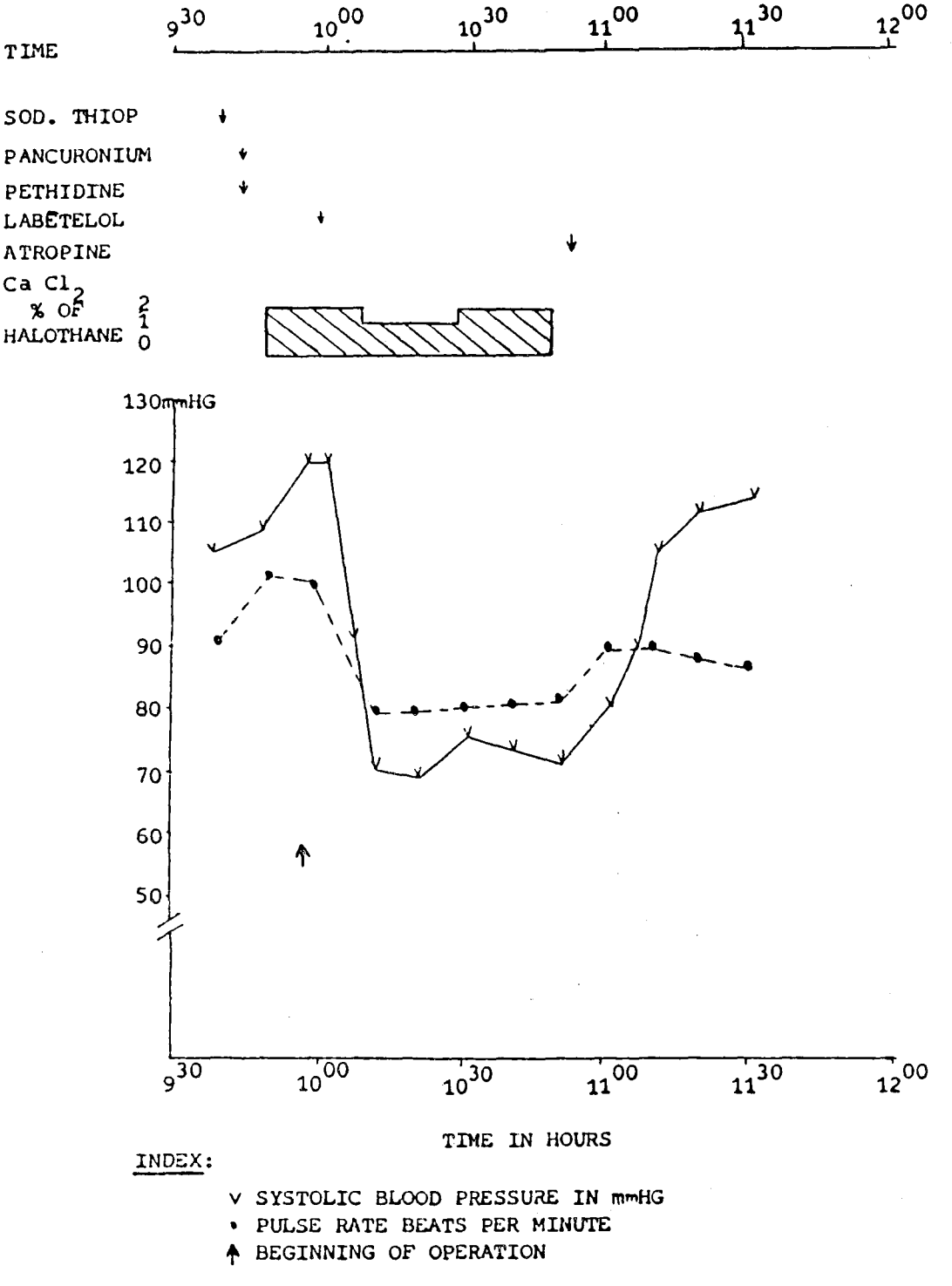


Figure 3. Plating femur – Male Age: 43

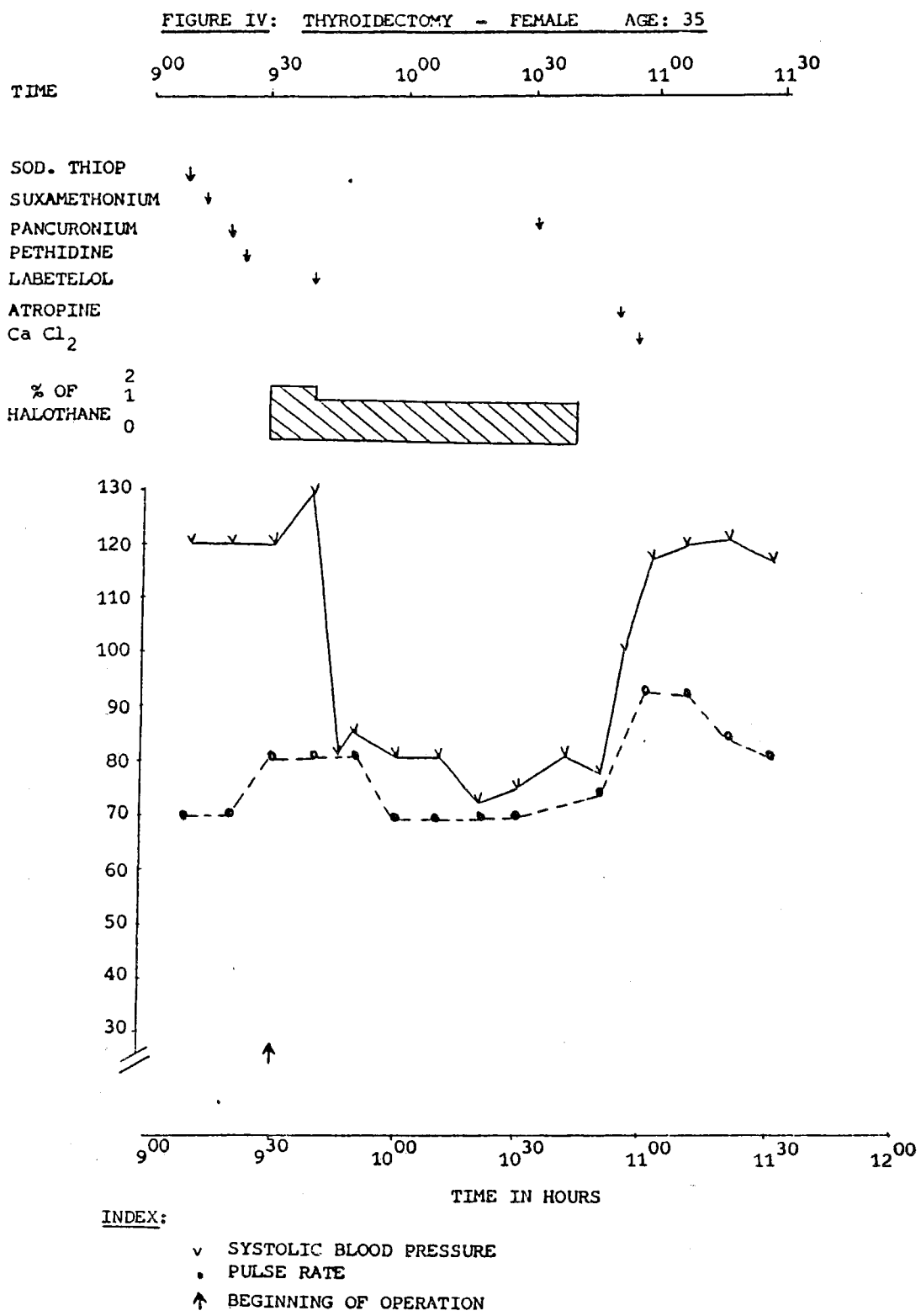


Figure 4. Thyroidectomy – Female. Age: 35

The safety of hypotensive anaesthesia is not dependant on any agent but on meticulous care to the details of the anaesthetic technique, especially good oxygenation, elimination of carbon dioxide and excellent analgesia. The bleeding at the surgical field depends on many factors like the blood pressure, the vascularity of the operative site and haemotological factors like coagulation factors, etc. One can modify the blood pressure by adjusting the cardiac output or the peripheral resistance. Labetelol, has both alpha and beta action thus affecting these two factors which influence cardiac output. By combining labetelol with halothane, it was able to control the systolic pressure to the desired level. The systolic arterial pressure was maintained around 80–70 mmHg. Finer adjustment in pressure was obtained by adjusting the halothane concentration. The halothane concentration 3% volume percent when used along with labetelol, resulted in a fall in cardiac output.[3] In this study, it was noted that the heart rate did not change much as compared to the pre-operative pulse rate – see figures 2, 3 and 4. In the three case illustrations, it is clearly shown that the fall in systolic pressure is marked, as compared to the drop in pulse rate. Before the closure, the systolic blood pressure was raised to 100 mmHg by turning off the halothane. This was followed by atropine administered intravenously and five minutes later calcium was given intravenously. Calcium is a non specific inotropic agent and it was found to reverse the myocardial depressant effect of halothane.[5]

There were no problems in raising the systolic pressure to 100 mmHg. In this study, the average dose of labetelol used was 25 mg and the average mean percent volume concentration of halothane used was 1–1.5. Blood is not always easily available in peripheral general hospitals. Thus, controlled hypotensive anaesthesia cuts down the need for blood and hence has the advantage of diminishing the risks of transmissible diseases and other complications of blood transfusion. This is a comparatively safe technique provided the anaesthesiologist is competent and takes meticulous care during the administration of general anaesthesia. However, hypotensive anaesthesia should not be used to overcome the inadequacies of surgery or anaesthesia. The advantages of the combination of labetelol with halothane are controllability simplicity and safety.

Acknowledgements

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