

ORIGINAL

Ketamine Anaesthesia in Patients with Renal Failure

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ABSTRACT

The use of ketamine 1 mg/kg and droperidol 0.05 mg/kg has no significant haemodynamic effect in patients with end stage renal disease (ESRD). This was observed in the study performed in 42 unpremedicated patients with chronic renal failure, scheduled for creation of arterio-venous fistula in the arm under general anaesthesia.

Patients with chronic renal failure usually present with major patho-physiological problems¹, which include fluid overload, electrolyte imbalance, anaemia, hypertension, uraemia, acidosis, etc. The risk and safety of anaesthesia and surgery in these patients are well recognised. The careful selection of anaesthetic technique and agents for these patients is essential to avoid morbidity and mortality².

Ketamine has unusual anaesthetic properties in that it produces unconsciousness and analgesia³. Ketamine raises both the pulse rate and systemic arterial blood pressure due to release of endogenous catecholamines and has a direct stimulant action on the myocardium and peripheral vessels⁴. Droperidol has a mild alpha-adrenergic-blocking properties causing slight vasodilatation and some fall in blood pressure⁵.

The aim of this study was to determine the effects and the usage of small doses of ketamine in patients with an increased haemodynamic instability.

METHODS

Ninety five patients with ESRD were undertaken for surgery of arterio-venous fistulas between year 1985-1987. Tables 1,2,3 and 4 give detailed information about the patients and tables 5,6 and 7 list the type of surgery and methods of anaesthesia utilized.

The patients were scheduled for urgent operation and no premedication was given. They commonly presented with the systemic complications of ESRD.

TABLE 1

Total Number of Cases

1985	24
1986	35
1987	36
Total	95

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TABLE 2
Sex Distribution

Male	45
Female	50
Total	95

TABLE 3
Nationality

Bahraini	81
Non-Bahraini	14
Total	95

TABLE 4
Age Distribution

10 – 20 years	4
20 – 30 "	18
30 – 40 "	13
40 – 50 "	16
50 – 60 "	29
60 – 70 "	10
> 70 "	5
Total	95

TABLE 5
Type of Surgery

Shunt	47
Fistula	40
Both	8
Total	95

TABLE 6
Anaesthetic Technique

G A	59
Local	34
Plexus block	2
Total	95

TABLE 7
Methods of General Anaesthesia

Ketamine	42
Relaxant	6
Volatile	11
Total	59

ANAESTHETIC TECHNIQUE

Fifty nine patients received general anaesthesia. Fortytwo patients underwent intravenous induction with ketamine 1 mg/kg and droperidol 0.05 mg/kg. Anaesthesia was maintained with nitrous oxide 50-60% in oxygen via Magil's circuit.

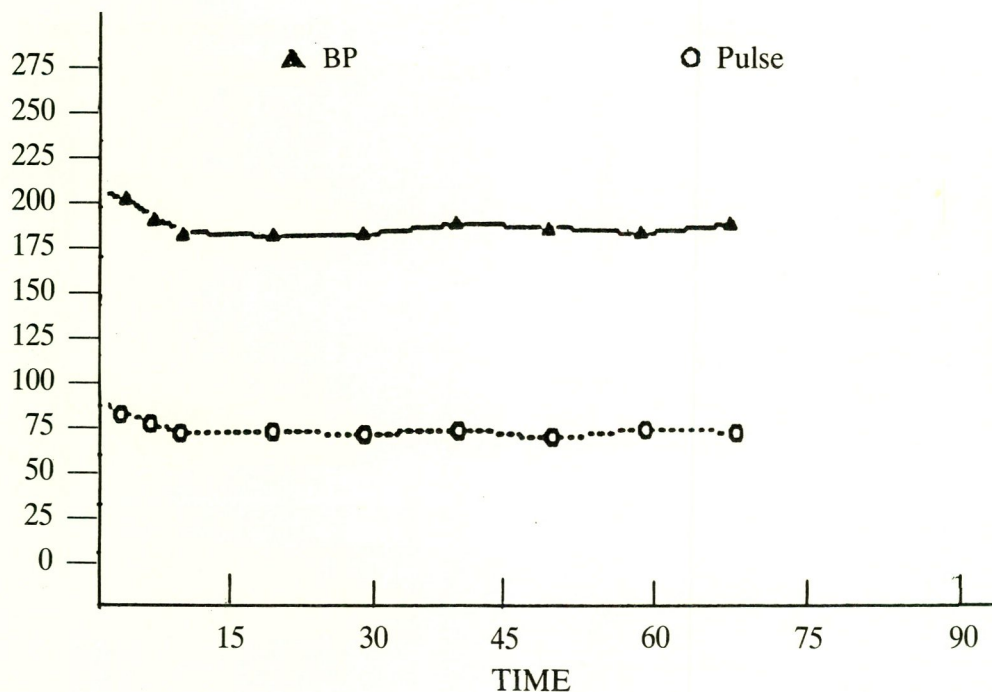
Continuous electro-cardio-graphic and pulse monitoring and intermittent blood pressure measurements were performed in all patients. Arterial blood was taken for gases analysis with induction, during the maintenance of anaesthesia and in the recovery room.

At the end of surgery patients were transferred to the recovery room for observation.

RESULTS

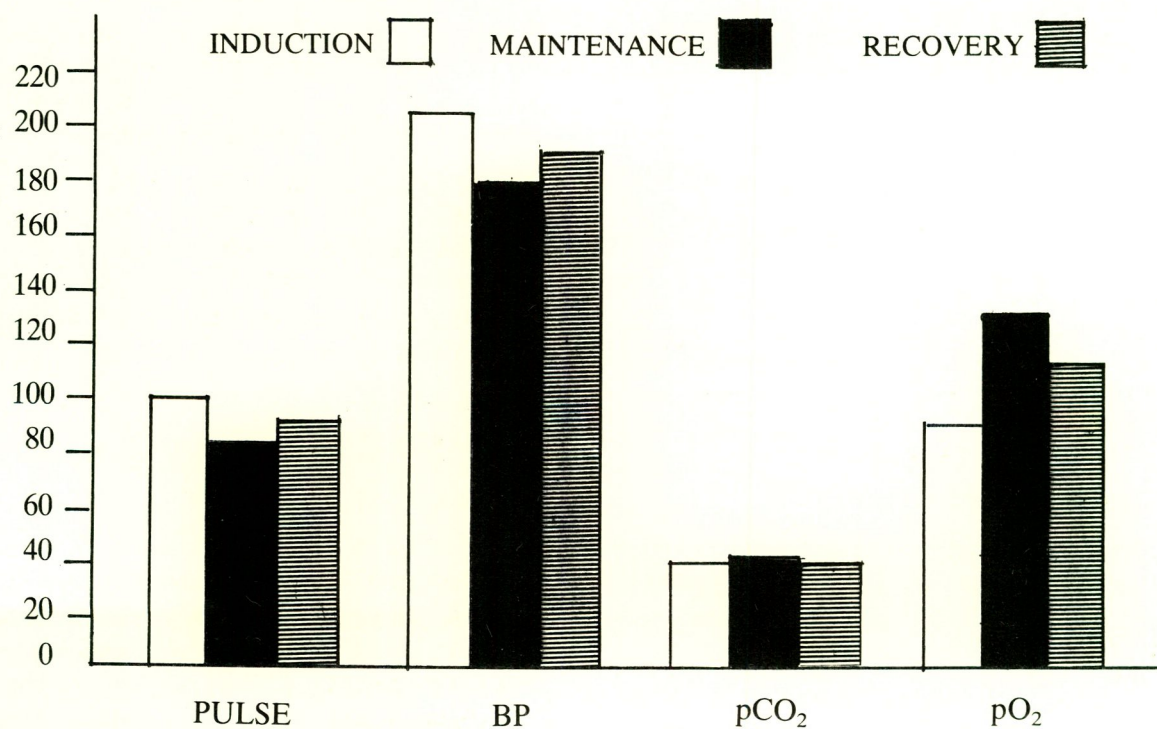
The induction ⁶ was smooth and the maintenance was uneventful. The average time of surgery was 80 minutes. Six patients required supplementation of ketamine during the procedure. There was significant fall in the arterial blood pressure and the pulse rate (figure 1 and 2) and there was an increase in arterial pO₂. The arterial blood pressure and the pulse rate had returned to the baseline in 2-3 hours after discontinuation of anaesthesia.

FIGURE 1



Changes in pulse and blood pressure (BP) during ketamine/ droperidol anaesthesia.

FIGURE 2



Comparison of pulse, blood pressure (BP), arterial pCO₂ and pO₂ during different stages of anaesthesia

The patients were fully conscious and alert at the end of the procedure. None of the patients experienced awareness during the procedure and hallucinations in the post-anaesthetic period. There were no changes in the general condition and the serum potassium level during the post-operative period. Haemodialysis was commenced the next day. There was no immediate morbidity or mortality.

DISCUSSION

Regional and general anaesthesia with inhalational techniques or muscle relaxants are commonly and successfully used. The action of the local anaesthetic agents is usually shorter than normal in these patients⁷. Halothane is common inhalational agent used, and care should be taken as the incidence of hepatitis is higher in patients with chronic haemodialysis. The effect of neuromuscular blocking agents is prolonged with the incidence of recurarization⁸. Atracurium the non-depolarizing neuromuscular blocking agent is preferred drug as its elimination is mainly by Hoffmann's route⁹.

The ketamine undergoes conjugation and is excreted in the urine. The metabolites of ketamine have weak properties of ketamine.

In this study ketamine produced prolonged analgesic effect¹⁰. The significant fall of the arterial blood pressure and the pulse rate during anaesthesia indicates that the haemodynamic effect of ketamine is abolished by the alpha-adrenergic blocking properties of droperidol.

CONCLUSION

In conclusion the haemodynamic effect of ketamine is abolished by the alpha-adrenergic effect of droperi-

dol and this technique of anaesthesia can be safely used in patients with ESRD and increased haemodynamic state¹¹.

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