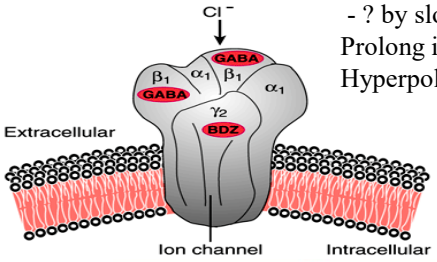

UNIVERSITY OF AUCKLAND
Waipapa Taumata Rau
NEW ZEALAND
MEDICAL AND HEALTH SCIENCES
Ketamine for sedation and extraction
Simon Mitchell
Bergen November 2025

1


Ketamine pharmacology

2

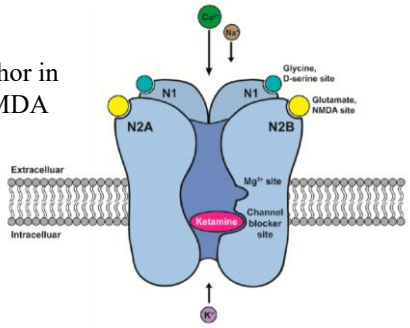
Thiopentone
Propofol
Etomidate
Midazolam



Enhance GABA action
- ? by slowing dissociation
Prolong inward Cl^- current
Hyperpolarisation

Blocks ionophor in excitatory NMDA receptors

Ketamine



3

3

Ketamine

- Phencyclidine derivative
- Blocks NMDA receptors
  - Induces general anaesthesia, but typically appears as a dissociative state
- Unique pharmacodynamic properties for an anaesthetic agent
  - Sympathomimetic – cardiovascular stimulant
    - Less likely to provoke hypotension, especially in a shocked patient
  - Vasoconstriction – less heat loss
  - Preserves respiratory drive
  - Preserves airway protective reflexes
  - Analgesic
  - Bronchodilator
- Administration IV, IM, PO (albeit with differing kinetics)

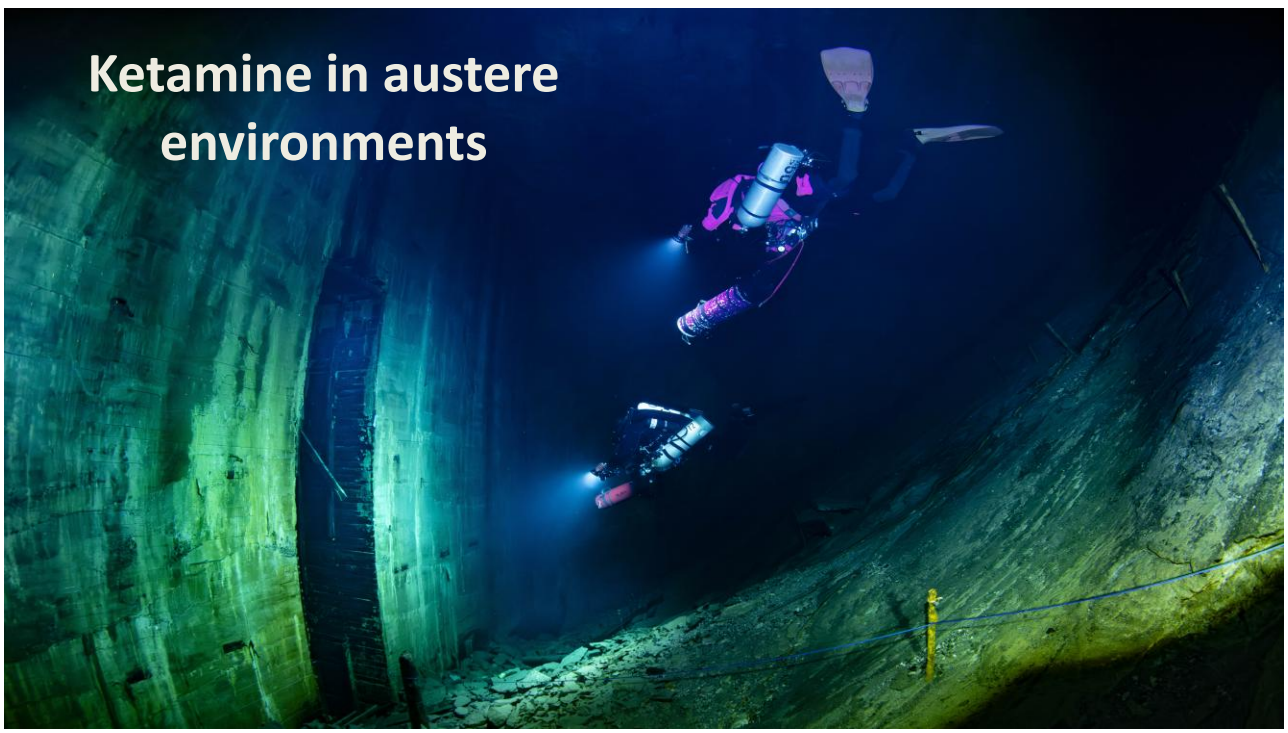
4

Route	Bioavailability	Onset	Induction Dose	Sedation Dose	Analgesic Dose
Intravenous	100%	30-60 seconds	0.5-2 mg/kg	0.2-0.8 mg/kg	0.15-0.25 mg/kg 0.05-0.25 mg/kg/hr
Intramuscular	93%	2-4 minutes	4-6 mg/kg	2-4 mg/kg	
Intranasal	40-50%	Within 10 minutes		(Volume limits adequate dose)	0.2-1 mg/kg
Rectal/oral	30-40%	20-45 minutes		3-10 mg/kg	0.5 mg/kg/day (TID-QID divided doses)

https://www.openanesthesia.org/keywords/ketamine/

5

5



6

Home / New Zealand

Christchurch earthquake: Doctor uses hacksaw in amputation

Martin Johnston
Reporter · NZ Herald · 25 Feb, 2011 09:00 AM · 3 mins to read

Both legs trapped

Urologist + anaesthetist

Ketamine

Morphine

Leatherman

Hacksaw

Bilateral amputation

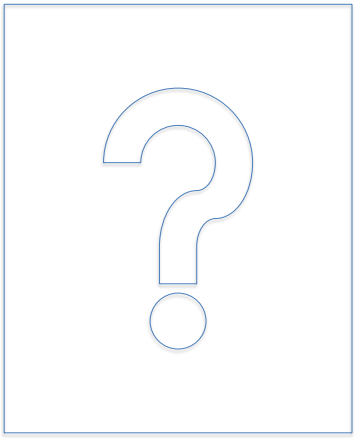
7

7

Level of desperation

Risks

Context sensitive (who and where)
Loss of airway
Respiratory arrest
Haemodynamics

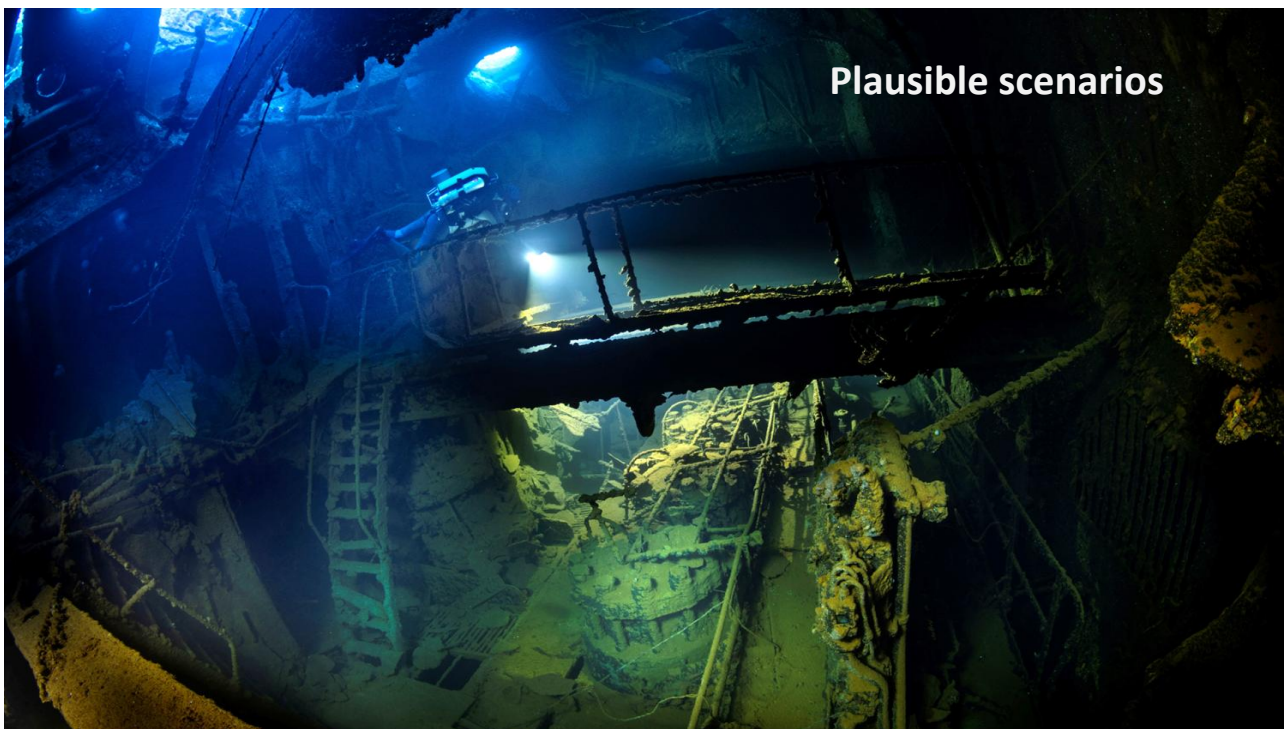


8

8

9

9



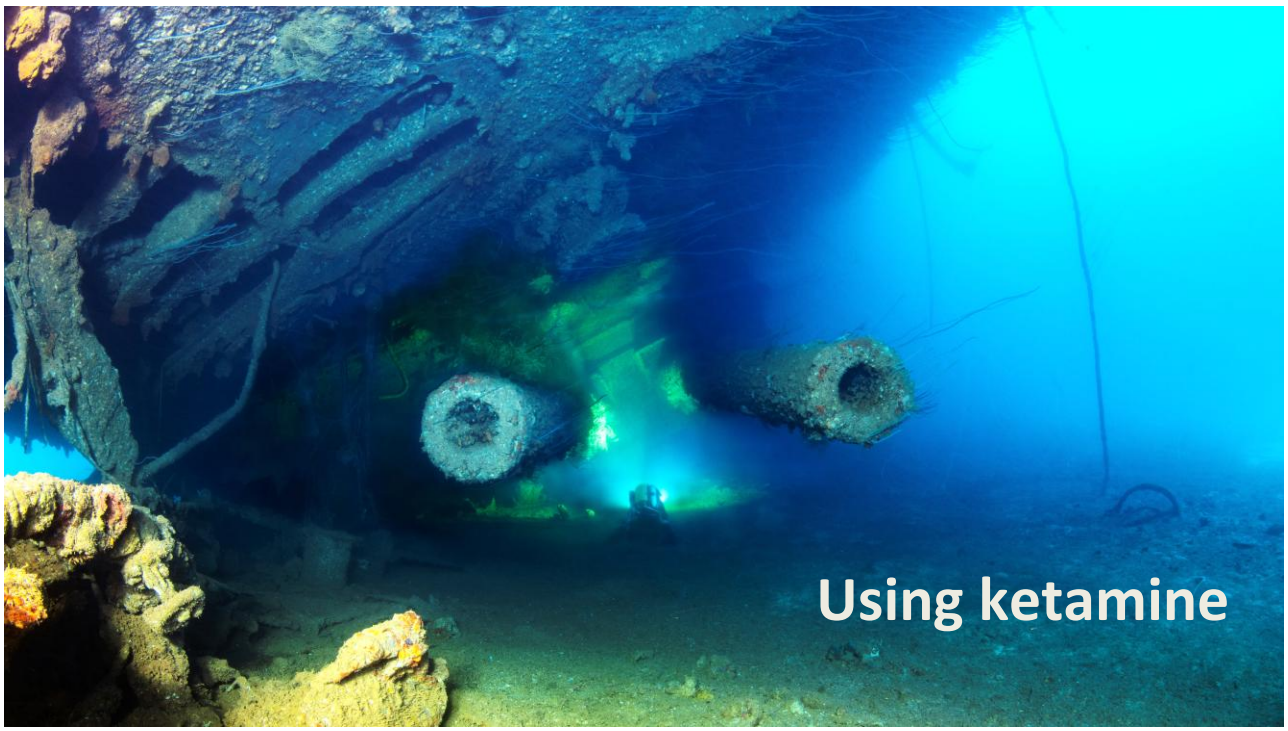
10

Possible ‘desperate’ uses in a diving environment

- Thailand–like situation (unlikely!)
  - Extracting children through a sump (concern is panic)
  - Extracting an injured adult through a sump (concern is agitation / pain)
- Trauma extrication in a dry cave or diving bell or saturation system (concern is agitation / pain)
- Pain relief in a diving bell or saturation system
- ‘Minor procedure’ (e.g., burn clean and dressing) in a saturation system

11

11



12

13

Minimum skills in the immediate environment

- How to draw up a drug and give an IM injection
- How to open / hold an airway e.g., jaw thrust
- How to use a bag / mask resuscitator
- How to insert an airway adjunct (oropharyngeal airway or laryngeal mask)


Jaw thrust


Bag / mask resuscitator


OP airway


Laryngeal mask

14

14

Minimum equipment in the immediate environment

- Syringes, needles and airway items on the previous slide
- Oxygen supply / regulator
- Means of 'passive' oxygen delivery
- Ideally a pulse oximeter and non-invasive blood pressure

High FiO_2 devices

Low FiO_2 device

15

Practical use

- Weight based dose calculation
- IM is safer in austere environment and/or less skilled hands
- Fasted patient
- Position with access to head
- Connect to pulse oximeter and NIBP if possible
- Anticipate need to support airway – especially in obese adult
- Anticipate the need to provide positive pressure ventilation
- Anticipate the need for repeat dosing depending on duration

16

What could possibly go wrong?!

- Difficulty positioning the patient e.g., in a bell
  - Think about this before anaesthetizing a patient
- Patient obstructs their airway
  - Airway manipulations / instrumentation
- Patient stops breathing
  - Positive pressure ventilation e.g., mouth-to-mouth, or bag-mask
- Emergence dysphoria
  - Reassurance, possibly benzdiazepines

17

17

Summary

- Ketamine is strong candidate drug if circumstances force sedation in an environment that precludes typical safety protocols for anaesthesia
- Despite its wide therapeutic index and positive properties, ketamine should only be used by trained practitioners
  - Extraordinary circumstances may justify non-compliance with this recommendation
  - IM is the safest route in anaesthetically unsafe settings
- Ketamine administration should only take place where equipment for oxygen provision and airway management is available

18

18

19