

# Accidental Awareness during General Anaesthesia and Surgery (AAGA)

Prof Michael Wang

Emeritus Professor of Clinical Psychology

Clinical Psychology Unit

Centre for Medicine

University of Leicester



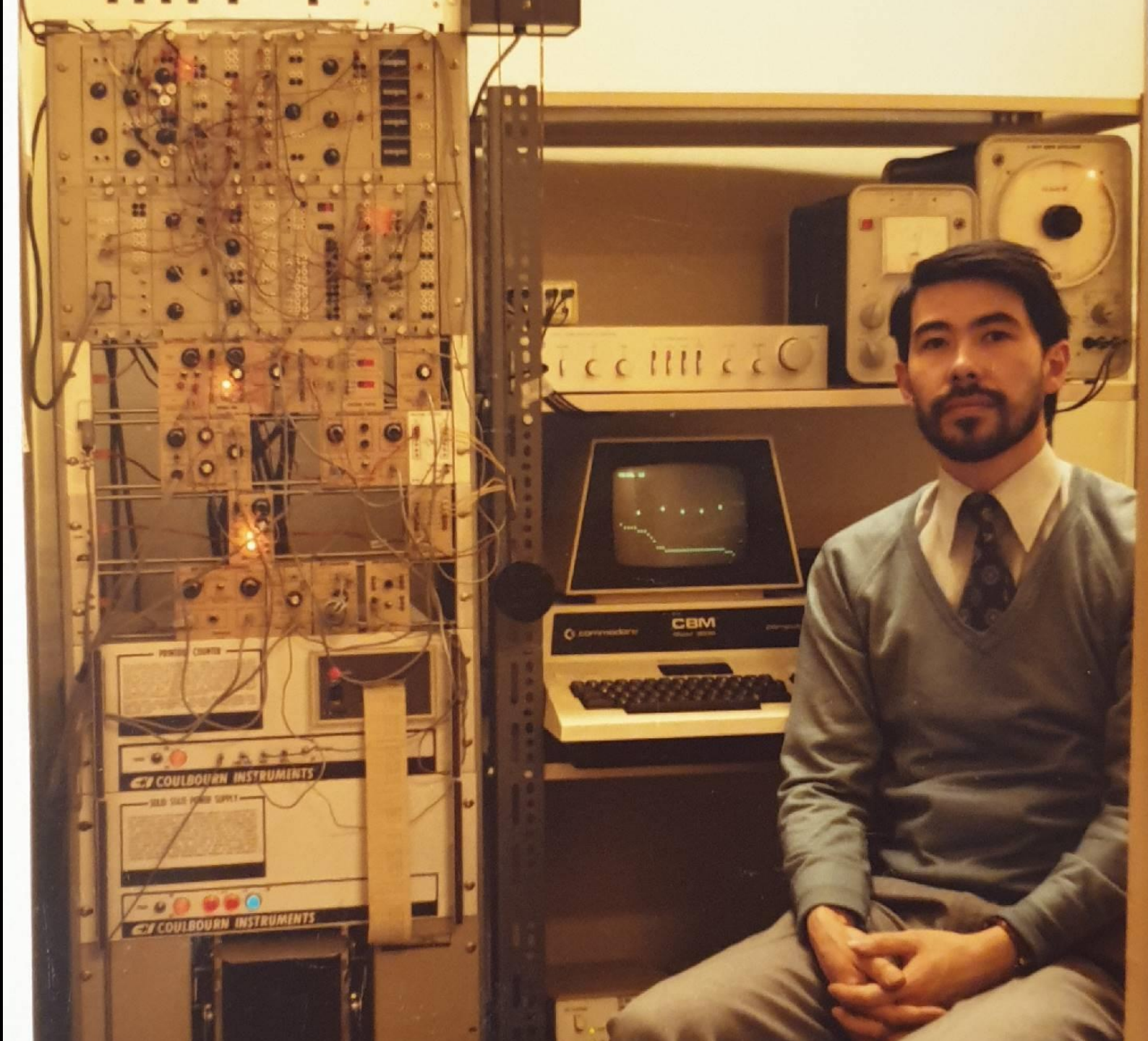
# Overview

- The nature of General Anaesthesia and role of muscle relaxant
- Incidence of AAGA
- AAGA effects and PTSD
- Cognitive misconceptions
- Treatment of AAGA PTSD
- Implicit Emotional Memory
- Treatment of Implicit Emotional Trauma



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# Incidence of Explicit Awareness

Authors	Year	% Aware	Sample
Hutchinson	1960	1.2	656
Harris et al.	1971	1.6	120
McKenna & Wilton	1973	1.5	200
Wilson et al.	1975	0.8	490
Lui et al.	1991	0.2	1000
Ranta et al.	1998	0.4	2612
Myles et al.	2000	0.11	10811
Sandin et al.	2000	0.15	11785
Wennervirta et al.	2002	0.10	3842
Sebel et al.	2004	0.13	19575
Avidan et al.	2008	0.20	1941
Avidan et al.	2011	0.16	5713

# Modified Brice Interview

1. What is the last thing you remember before surgery?
2. What is the first thing you remember after surgery?
3. Do you remember anything happening during surgery?
4. Did you have any dreams during surgery?
5. What is the worst thing about your surgery?

# Components of a General Anaesthetic

1. HYPNOTIC: causes loss of consciousness
2. ANALGESIC: impairs pain perception and protects against physiological shock
3. **MUSCLE RELAXANT: causes paralysis to assist surgeon**

These are independent of each other and produced by different drugs







The Isolated Forearm Technique



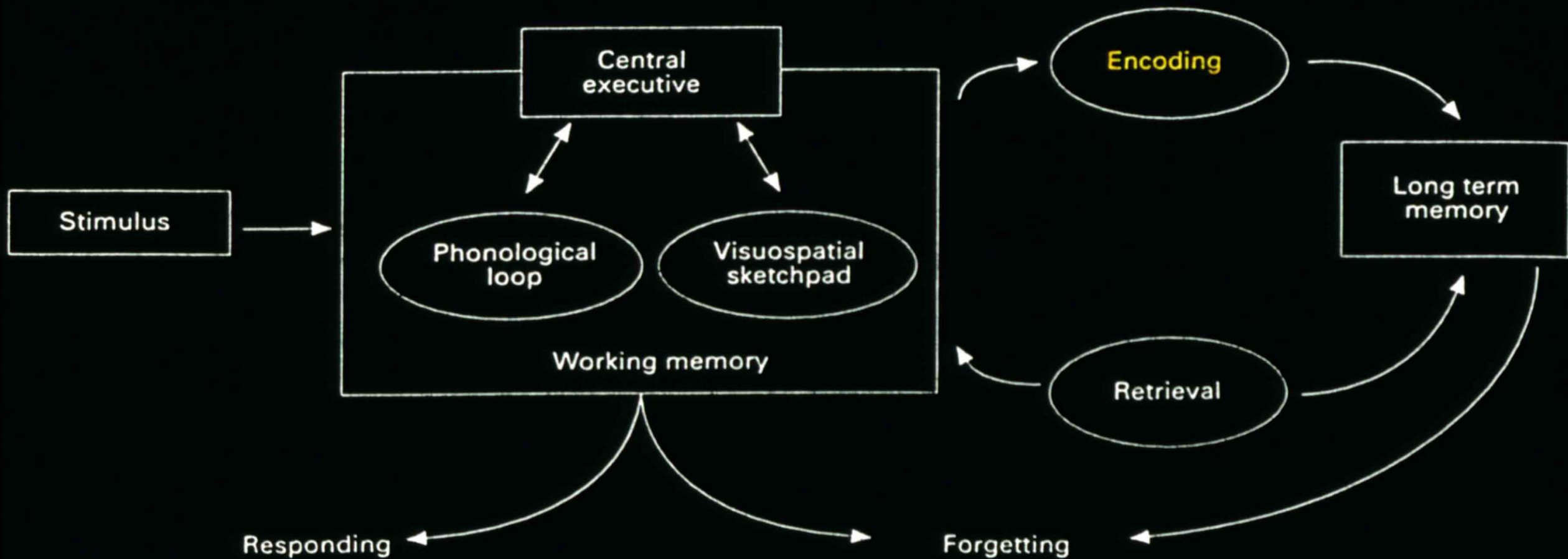
# NITROUS OXIDE / FENTANYL

Patient	Dreams	Reflexes	Response	Recall	Comments
1	bad	-	-	-	Dream : Pain, like bee being cut in half
2	-	-	-	-	
3	bad	-	2	yes	Dream : Alone on earth, no one to talk to
4	Abandoned excessive reflex activity, raised BP > than cuff pressure				
5	-	5	-	-	
6	-	15	4	-	
7	Neutral	3	-	-	Opened eyes 6 times; no responses
8	-	6	3	-	Opened eyes 3 times; no responses
9	-	2	-	-	
10	-	20	2	-	Thought this was a wonderful anaesthetic
11	Neutral	6	2	-	Dream : Bus journey
12	Abandoned because of raised BP				
13	-	-	-	-	
14	bad	4	-	-	Dream : Being buried alive
15	-	-	-	-	
16	-	1	2	-	
17	-	3	1	-	
18	-	-	-	-	
19	bad	-	1	-	Dream : Blind, unable to open eyes
20	-	5	-	-	
21	-	-	-	-	Asystole : Atropine 0.6 mg, ECM
22	-	3	1	-	
23	-	1	4	-	
24	-	-	-	-	
25	-	10	2	-	

**Consciousness is independent of memory**

PREFRONTAL CORTEX

MTL, H, PNC



# Anaesthetists' beliefs

- Most imagine the awareness rate to be about 1 in 10,000
- Most claim they have never had a single case
- Most believe “clinical signs” of autonomic arousal are reliable indicators
- Many believe BZs cause retrograde amnesia

Lau K, Matta B, Menon D and Absalom A.

Attitudes of anaesthetists to awareness and depth of anaesthesia monitoring in the UK

*European Journal of Anaesthesiology* (2006), 23: 921-930

# Anaesthetic denial

- Surveys of anaesthetists concerning incidence of AAGA
- Serious effects of medical and nursing denial during 1960s to 1990s on AAGA sufferers
- NAP5



# NAP5

5th National Audit Project of  
The Royal College of Anaesthetists and the  
Association of Anaesthetists of Great Britain and Ireland



## Accidental Awareness during General Anaesthesia in the United Kingdom and Ireland

### Report and findings

September 2014

#### Editors

Professor Jaideep J Pandit

Professor Tim M Cook



The Royal College of Anaesthetists



Association of Anaesthetists of  
Great Britain and Ireland



ASSOCIATION OF CLINICAL PSYCHOLOGISTS

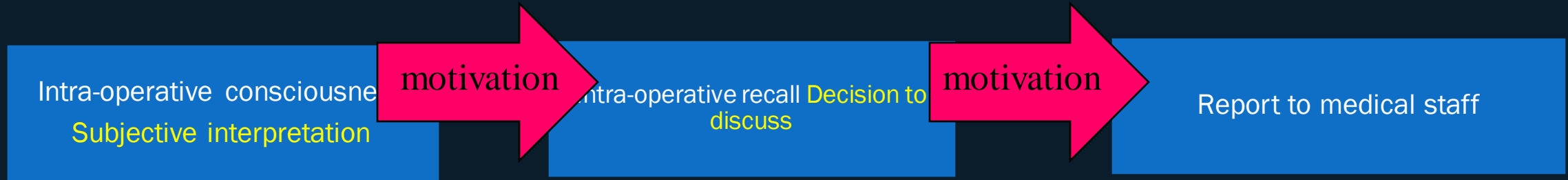
# National Audit Project #5

- Royal College of Anaesthetists & Association of Anaesthetists of Great Britain and Ireland
- July 2012 to June 2013
- Gathered reports from both countries: 3 million GAs over a one-year audit period, >300 new awareness cases
- 51% episodes caused distress, 41% long term psychological problems

# NAP5: main findings

- Report incidence 20 x lower than Brice (1:600) : 1:19,000
- Over-representation of muscle relaxants: 96% NAP5 reports vs 46% GAs
- 50% distressed at time of AAGA
- AAGA distress strongly predicted post-op sequelae
- Distress most frequently concerned experience of paralysis

# From AAGA to reporting



- amnesia
- delayed recall
- meaning?
- dream?

- trivial
- too distressing
- don't want to complain:

gender, personality,  
culture,  
consequences  
for treatment,  
consequences for  
anaesthetist

- Will I be believed?
- Is it my fault?
- How will they react?
- Litigation?
- Apology?
- Altruism

# “Trust me, I’m a doctor” BBC2 2001



**“Betty”**  
**Caesarean section**  
**18th May 1962b**



“I woke up as they pulled my baby out.

The pain was horrific.

She said ‘*she wanted a boy*’

I tried to wiggle toes and fingers, I tried to scream. I couldn’t move - that was the worst part.

At one stage I was looking down on surgeons’ heads watching the operation - I had no pain at this time.

Then I was back on the operating table looking up - and the pain was back.

I could hear everything. I thought I was in Hell.”

# Consequences of awareness & recall

## Flashbacks & Cued Flashbacks

- Seeing a carcass of meat in a butcher's shop
- Crossword clues - eg scalpel
- Films: hospital or horror
- She is unable to drive – danger of flashback triggers

## Phobias & avoidance

- Escalators
- Unable to lie on her back
- Unable to visit new grandchild in maternity hospital

# Retrospective Group Studies

Author(s)	N	Recruitment	Data collection	Symptomatology
Guerra 1986	19	Referral from colleagues	interview	anxiety, depression, anger
Evans 1987	27	newspaper advertisements	postal questionnaire	horror of hospitals (2) avoidance of ops (5) nightmares (1)
Cobcroft & Forsdick 1993	187	women's magazine appeal	analysis of letters	nightmares (16), chronic mental problems (12), panic attacks (2), phobias (3)
Moerman et al 1993	26	Prompted colleague referrals	semi-structured interview	sleep disturbance, nightmares, flashbacks, anxiety (18)
Cundy 1993	34	referral from colleagues	semi-structured interview	post-traumatic stress disorder(24)
Cundy & Dasey 1996	38	referral from colleagues	semi-structured interview	post-traumatic stress disorder(30)
Schwender et al. 1998	45	newspaper advertisements	Structured interview	anxiety & nightmares (11), PTSD (3)
Ranta et al. 1998	5	4818 consecutive operations	Structured interview	sleep disturbance (1)
Samuelsson et al. 2007	98	2681 consecutive operations	Structured interview	Nightmares (11), anxiety (10), flashbacks (9)



# Specific psychological problems following Anaesthetic Awareness (Jones & Wang, 2004)

- Nightmares, night terrors, often related to paralysis
- Insomnia
- Avoidance of hospital/medical settings and personnel
- Loss of trust in establishment figures
- Relationship difficulties
- Clinical depression

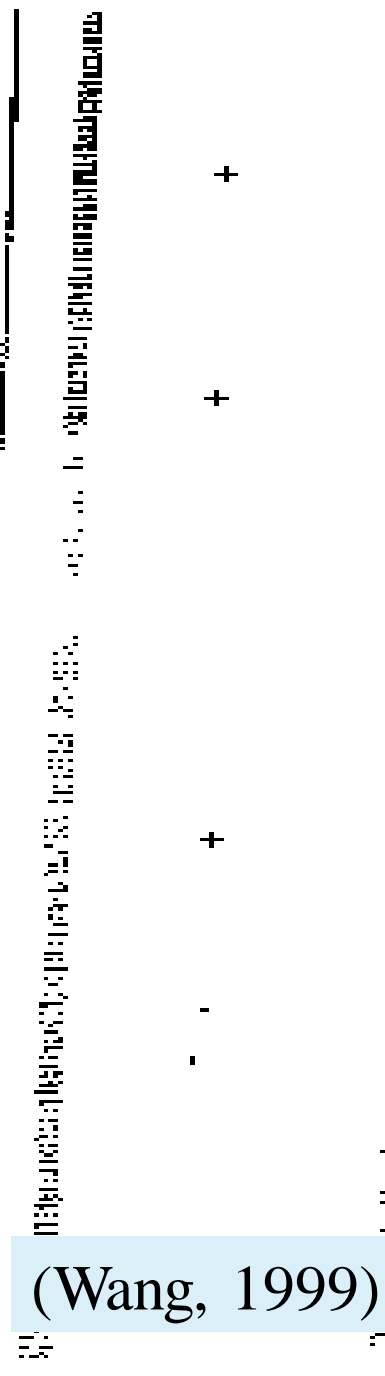
# Audit of 25 successive AA referrals (Wang, 2008)

Had muscle relaxants and found paralysis distressing (4 MR only)	25	100%
Experienced intra operative pain	12	48%
Found to have significant psychological problems at follow-up	23	92%
Number of women	19	76%

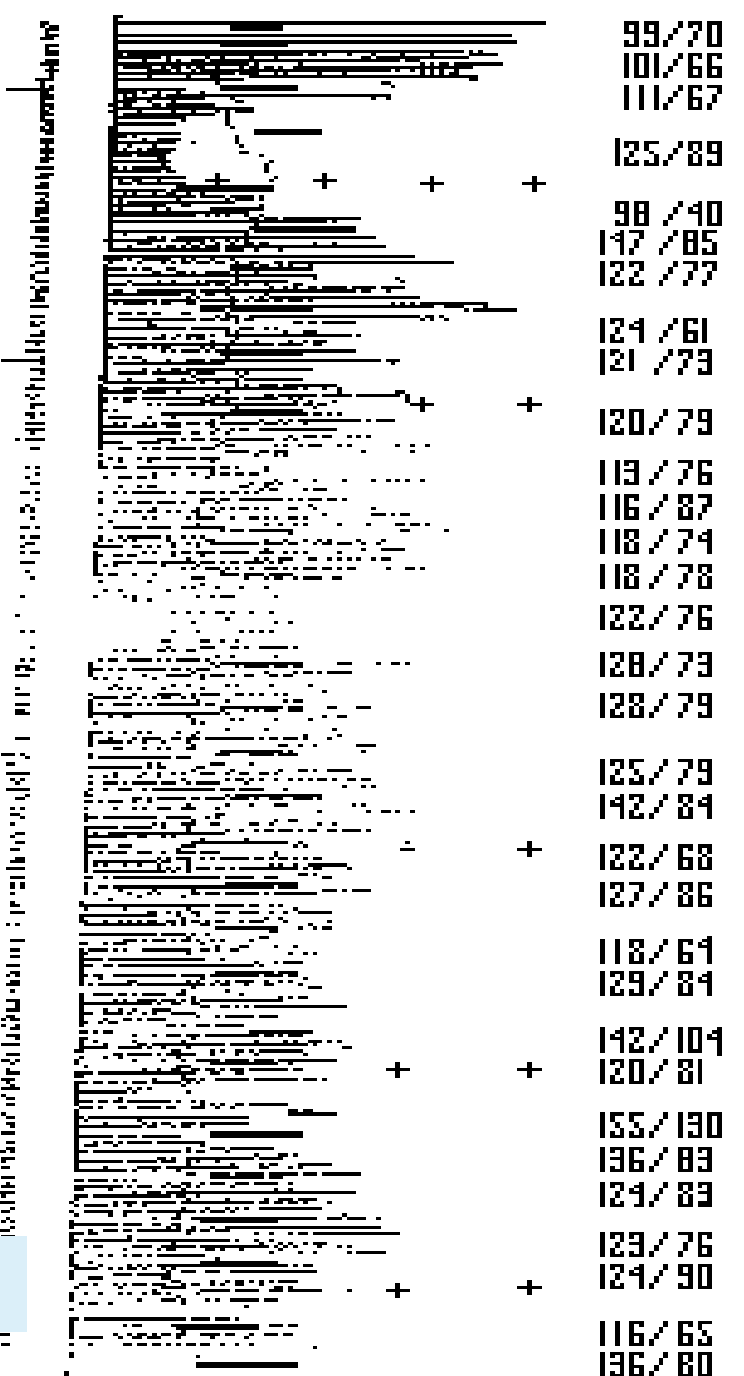
# Assessment of AAGA PTSD

- Detailed patient interview
- Patient's understanding of what happened intra-operatively
- Flashback and nightmare content and implications
- Review of anaesthetic and nursing notes at time of op





(Wang, 1999)



# Examples of *intra-operative* cognitive misconceptions causing trauma

- surgeon has cut spinal cord
- interaction of drugs has caused *permanent* paralysis
- I have died on the operating table
- Sleep paralysis example

“Betty”  
Caesarean section  
18th May 1962b



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# Betty's recurrent nightmare (over 40 years)

- Replay of AAGA experience including out-of-body experience
- Operating trolley moved towards exit doors
- Extreme fear of what might be beyond the doors (death)

## *Treatment*

- Located moth-balled theatre
- Took Betty to the theatre, found the doors and opened them
- Videoed exposure episode and gave recording to Betty to watch at home



# Treatment of AAGA PTSD

- Formulation, including role of misconceptions and paralysis
- Psychoeducation addressing misconceptions
- Exposure to key issues/themes
- Explore thoughts, feelings, memories prompted by exposure
- Confront misconceptions and irrational thoughts – advantages and disadvantages
- Rehearse and practice more rational alternative thoughts
- homework

# Announcement

**Second International Symposium  
on Memory and Awareness in Anesthesia  
Atlanta, Georgia  
April 23-25, 1992**

## CALL FOR ABSTRACTS

The Department of Anesthesiology and the Department of Psychology of Emory University are pleased to announce that the Second International Symposium on Memory and Awareness in Anesthesia will be held at the Hotel Nikko, Atlanta, April 23-25, 1992.

Abstracts are invited on the following topics: Awareness in general anesthesia, including definition, occurrence/incidence, and causes; memory for intraoperative events; effects of suggestion; information processing in the unconscious mind; memory and awareness in relation to anesthetics used; techniques for monitoring the nervous system.

Abstracts, preferably one page single spaced, should be sent to one of the members of the organizing committee: Eugene Winograd, Department of Psychology, Emory University, Atlanta, GA 30322; Peter Sebel, Department of Anesthesiology, Crawford Long Hospital, Glenn Building, 25 Prescott Street, N.E., Atlanta, GA 30308; or Benno Bonke, Department of Medical Psychology, Faculty of Medicine, Erasmus University, Rotterdam, The Netherlands. The deadline for receipt of the abstracts is November 1, 1991.

For registration information, write to Susan J. Duensing, Continuing Medical Education Program Director, Emory University School of Medicine, 1440 Clifton Road, N.E., 109 WHSCAB, Atlanta, GA 30322.



HYATT

HYATT

# FOUR Medical Mavericks

Home

Episodes



On iPlayer

Not available



# Conclusion

- AAGA is uncommon but not rare (1:600 ops)
- Estimated 50% result in psychological distress
- Experience of awake paralysis is usually traumatic
- Cognitive misconceptions are central
- Treatment involves identifying misconceptions, correcting these and exposure to trauma cues
- Implicit emotional memory with trauma may also occur in the absence of explicit recall and is more difficult to treat

**Thank you**  
**Questions/Comments?**

**mw125@le.ac.uk**



# The Royal College of Anaesthetists

