

An audit of unplanned postoperative intensive care unit admissions in Enugu, Nigeria: Causes and outcome



Department of Anaesthesia, University of Nigeria Teaching Hospital, Ituku Ozalla, Enugu, Nigeria

U V Okafor, MB BS, DA, FMCA

Objective. To carry out an audit of unplanned postoperative (anaesthetic and surgical) intensive care unit (ICU) admissions in our hospital. It was hoped that this would serve as a tool to assess the peri-operative management of surgical patients in our centre.

Materials and methods. The hospital records of unbooked or unplanned post-surgical/anaesthetic admissions to our ICU from March 2003 to February 2007 were reviewed. Patient demographics, surgical and anaesthetic records, duration of stay in the unit, interventions and patient outcome were noted. Obstetric patients were not included.

Results. There were a total of 497 ICU post-surgical/anaesthetic admissions to our ICU during the 4-year study period, of which 26 were unplanned. There were 6 581 anaesthetics/operations in the general operating theatre during the study period, giving an unplanned postoperative ICU admission rate of 3.9/1 000 anaesthetics or 0.39%. Six admissions were related to anaesthetic complications and 20 to surgical complications. The average duration of stay was 3.2 days.

There were 8 deaths, giving a mortality rate of 1.2/1 000 anaesthetics/operations. Of the deaths 2 were associated with anaesthetic complications and 6 with surgical complications (there were 3 deaths after thyroidectomy, 2 after rigid bronchoscopy and 1 due to massive haemorrhage).

Conclusion. The majority of the admissions to the ICU followed head and neck surgery. These findings will modify practice in that more senior surgeons and anaesthetists will be involved in procedures involving the head and neck, and the necessary modern equipment will be acquired. Meticulous pre-operative assessment may detect potentially difficult cases, which should be managed by the most experienced hands.

Unplanned post-anaesthetic and surgical admissions to the intensive care unit (ICU) can provide an insight into the standard of peri-operative management in operating theatres and ICU resource management,¹ including quality of anaesthetic care.^{1,2} Assessing anaesthetic-related mortality and morbidity has been a widely used technique to guide improvement initiatives in patient safety.³⁻⁶ Because these outcomes rarely provide full information about the process of care, a number of measurement tools have been introduced into anaesthesia and surgery.¹ These include incident reporting, critical incident analysis techniques and organisational safety.⁷⁻⁹ These have been reported to have limitations,¹ as voluntary incident reporting systems, for example, have been shown to undercount incidents by 77 - 94%.^{10,11}

Because of the recent increasing interest in the development of assessment tools in anaesthesia and critical care services, we undertook this study in our centre to audit unplanned post-anaesthetic and surgical admissions to our ICU as a guide to improving the standard of care in our centre.¹²

Materials and methods

The hospital records of consecutive unbooked or unplanned post-anaesthetic/surgical admissions from the general operating theatre to our ICU from March 2003 to February 2007 were retrospectively reviewed. Patient demographics, surgical and anaesthetic records, duration of stay in the unit, interventions and patient outcome were all noted. In our centre



Be alert. Know how to act.



Control the bleed in Acquired Haemophilia

Fact box – Acquired Haemophilia

- A rare but severe bleeding disorder with up to 22% mortality rate^{1,2}
- Caused by autoantibodies against a coagulation factor, most often factor VIII^{1,2,3}
- Laboratory diagnosis - the typical findings of acquired haemophilia are a prolonged activated partial thromboplastin time (APTT) and a low factor VIII level¹

Recognise the clinical signs

- Affects patients of all ages and sexes^{1,4,5}
- Can be associated with autoimmune disease, malignancy or pregnancy, but most often idiopathic in nature⁴
- Symptoms include bleeding into skin (purpura) and soft tissues^{1,5}



References: **1.** Giangrande P. Treatment of Hemophilia: Acquired Hemophilia Dec 2005; No 38. www.wfh.org. **2.** Holme PA *et al.* Acquired haemophilia: management of bleeds and immune therapy to eradicate autoantibodies. *Haemophilia* 2005; 11:510-515. **3.** Mytopher K *et al.* Acquired hemophilia A presenting postpartum. *Canadian Medical Association Journal* 2007;177(4):339-340. **4.** Collins PW *et al.* Acquired hemophilia A in the United Kingdom: a 2-year national surveillance study by the United Kingdom Haemophilia Centre Doctors' Organisation. *Blood* 2007;109:1870-1877. **5.** Yee T T *et al.* A survey of patients with acquired haemophilia in a haemophilia centre over a 28-year period. *Clin. Lab. Haem.* 2000; 22:275-278.

Novo Nordisk (Pty) Ltd Reg. 1959/000833/07. 10A Achter Rd. Paulshof. Sandton. 2056.
P.O. Box 783155. Sandton. 2146. Tel: (011) 202 0500. Fax: (011) 807 7989. www.novonordisk.co.za.
NDG P53057. Version 04/09 Version 1.



anaesthesia is provided by specialists and trainee specialists. Obstetric theatre patients were not included in this study.

Results

During the 4-year study period there was a total of 497 admissions to our ICU, of which 26 were unplanned postoperative ICU admissions (UIAs). There were 6 581 anaesthetics/surgeries in the general operating theatre during the study period, giving a rate of UIAs of 3.9/1 000 anaesthetics or 0.39%. The average age of the UIA patients was 29.4 years (range 4 weeks - 75 years), and there were 17 males and 9 females. Six admissions were related to anaesthetic complications, including 3 patients in whom there had been failure of intubation with asphyxia. There were 20 surgery-related complications. Of these patients 6 had had thyroidectomy, 4 maxillofacial surgery, 6 rigid bronchoscopy/oesophagoscopy and 3 neck surgery; 1 patient had postoperative shock. The average duration of stay was 3.2 days.

There were 8 deaths, giving a mortality rate of 1.2/1 000 anaesthetics or 30.7% of the UIAs. Of the deaths 2 were associated with anaesthetic complications and 6 with surgical complications (3 deaths after thyroidectomy, 2 after rigid bronchoscopy and 1 due to massive haemorrhage). Of the operations 22 were elective and 4 emergencies. All the patients received general anaesthesia. Eight patients received oxygen through endotracheal tubes and 17 through intranasal catheters or tracheostomy tubes, only 1 patient receiving mechanical ventilation. Seven patients received pressor agents, bronchodilators and hydrocortisone as part of their management.

Discussion

The reported incidence of failed intubation in the general operating theatre is 1:2 230,¹³ which is similar to our figure of 1:219 (3 cases). The other anaesthesia-related complications were due to intra-operative dislodgement of the endotracheal tube and respiratory distress following oral and urological surgery. Of the patients admitted after surgically related complications 75% had had head and neck surgery, with the vast majority developing postoperative respiratory distress.

Our 23% (as a percentage of UIA) rate for anaesthetic-related postoperative complications is higher than the figure from an Australian study (5.5%).¹⁴

The average age of the patients in our study was much lower than that reported by 2 studies in Australia and 1 in India, in which the majority of the patients were over 60 years old.^{12,14,15} This probably implies that most of our patients in our study were without co-morbidity, and could indicate limitations in patient management. There is a need to involve more consultants in patient management and to use fibre-optic bronchoscopy/

oesophagoscopy for diagnostic procedures. The incidence of UIA (0.3%) in this study is higher than that reported by Swann *et al.* (0.08%),¹⁶ Leigh and Tytler (0.04%)¹⁷ and Rose *et al.* (0.27%),¹⁸ but lower than that reported by Bhat *et al.* (0.58%)¹⁹ and Cullen *et al.* (0.42%).²⁰

Three of our patients required emergency tracheostomy in order to maintain a patent airway. Eighteen of the 20 surgery-related UIA could probably not have been predicted, compared with 5 of the 6 anaesthesia-related admissions. This means that 23 of the 26 UIAs could probably not have been predicted, which is a major reason why UIAs are considered a valuable tool in detecting avoidable iatrogenic complications related to surgical and anaesthetic care.

As aptly stated by Haller *et al.*,¹ UIA is probably more a global indicator of the safety of surgical care (anaesthetic and surgical) than of specific anaesthetic outcome. This was the finding in their study, and despite our smaller numbers our figures are similar to those reported by the Quality in Australian Healthcare Study (QAHCS) and the Harvard medical practice study.^{21,22} Both the latter studies found that 34 - 76% of preventable adverse events were related to failures and errors in the technical performance of a procedure or operation. The high number of UIAs associated with thyroid surgery and rigid bronchoscopy shows that these procedures in particular need proper investigations and thorough pre-operative assessment. The 8 deaths gave a mortality rate of 30.7% or 1.2/1 000 anaesthetics. This is much higher than the 14.5% mortality in the study by Piercy *et al.*,¹⁴ but lower than the 36.2% of Bhat *et al.*¹⁹ There is a paucity of studies on UIAs from general operating theatres in Nigeria, but there are a few on the obstetric population.

Conclusion

The majority of both anaesthetic- and surgery-related postoperative UIAs to our ICU followed head and neck surgery. This indicates that experienced anaesthetists and surgeons should handle this group of patients, and that skills should be improved. Meticulous pre-operative assessment may detect potentially difficult cases, which should be managed by the most experienced hands. Fibre-optic laryngoscopes and bronchoscopes should be acquired.

We thank the obstetric theatre and hospital records department for their assistance, and Miss Mercy Nwodo who graciously typed the manuscript.

- Haller G, Myles P, Wolfe R, *et al.* Validity of unplanned admission to an intensive care unit as a measure of patient safety in surgical patients. *Anesthesiology* 2005; 103: 1121-1129. www.ncbi.nlm.nih.gov/pubmed/16306722.
- Toomtong P, Vorakitpokorn P. Unplanned admission to Siriraj post-anaesthetic intensive care unit. *J Med Assoc Thai* 2002; 85: suppl 3, S1000-1009. http://www.ncbi.nlm.nih.gov/pubmed/12452242?ordinalpos=2&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum.
- Arbous MS, Meursing AE, Van Kleef JW, *et al.* Impact of anesthesia management characteristic on severe morbidity and mortality. *Anesthesiology* 2005; 102: 257-268. http://www.ncbi.nlm.nih.gov/pubmed/15681938?ordinalpos=1&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum.

4. Lagasse RS. Anesthesia safety: Model or myth? A review of the published literature and analysis of current original data. *Anesthesiology* 2002; 97: 1609-1617. www.ncbi.nlm.nih.gov/pubmed/12459692.
5. Turnbull A, Tindall VR, Beard RW, et al. Report on confidential enquires into maternal death in England and Wales 1982 - 1984. *Rep Health Soc Subj (Lond)* 1989; 34: 1-166. www.ncbi.nlm.nih.gov/pubmed/2641172.
6. Lunn JN, Devlin HB, Farrow SC, et al. Lesson from the confidential enquiry into perioperative deaths in three NHS regions. Epidemiology in anaesthesia: I. Anaesthetic practice over 20 years. *Lancet* 1987; 2: 1384-1386.
7. Sexton JB, Thomas EJ, Helmreich RL. Error, stress and teamwork in medicine and aviation: cross sectional survey. *BMJ* 2000; 320: 745-749. qshc.bmj.com/cgi/content/full/14/4/231.
8. Singer SJ, Gaba DM, Geppert JJ, et al. The culture of safety: Result of an organization-wide survey in 15 California hospitals. *Qual Saf Health Care* 2003; 12: 112-118. www.qmhjournal.com/pt/re/qmhc/selectreference.htm;jsessionid...111208646008491?an=00019514...P91&data...singer.
9. Cooper JP, Newbower RS, Long CD, et al. Preventable anaesthesia mishaps: A study of human factors. *Anesthesiology* 1978; 49: 399-406. bja.oxfordjournals.org/cgi/content/full/85/2/271.
10. Cullen DJ, Bates DW, Small SD, et al. The incident reporting system does not detect adverse drug effects: a problem for quality improvement. *J Comm Qual Improv* 1995; 21: 541-548. http://www.ncbi.nlm.nih.gov/pubmed/8556111?ordinalpos=3&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum.
11. Stanhope N, Crowley-Murphy M, Vincent C, et al. An evaluation of adverse incident report. *J Eval Clin Pract* 1999; 5: 5-12. http://www.ncbi.nlm.nih.gov/pubmed/10468379?ordinalpos=2&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum.
12. Sarika M, Dewoolkar L, Rao S. Analysis of anesthetic intensive care unit admission: The anesthesiologists' perspective. *The Internet Journal of Anesthesiology* 2007; 13: 1.
13. Lyons G. Failed intubation. Six years' experience in a teaching maternity unit. *Anaesthesia* 1985; 40: 759-762. http://www.ncbi.nlm.nih.gov/pubmed/4037269?ordinalpos=3&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum.
14. Piercy M, Lau S, Loh F, et al. Unplanned admission to the intensive care unit in postoperative patients - an indicator of quality of anaesthetic care. *Anaesth Intensive Care* 2006; 34: 592-598. cat.inist.fr/?aModele=afficheN&cpsid=18225015.
15. Haller G, Myles DS, Langley J, et al. Assessment of an unplanned admission to the intensive care unit as a global safety indicator in surgical patients. *Anaesth Intensive Care* 2008; 36: 190-200. http://www.ncbi.nlm.nih.gov/pubmed/18361010?ordinalpos=4&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum.
16. Swann D, Houston P, Goldberg J. Audit of intensive care unit admissions from the operating room. *Can J Anaesth* 1993; 40: 137-141. www.cja-jca.org/cgi/content/abstract/40/2/137.
17. Leigh JM, Tytler JA. Admissions to intensive care unit after complications of anaesthetic techniques over 10 years - the second 5 years. *Anaesthesia* 1990; 45: 814-820. www.ncbi.nlm.nih.gov/pubmed/2240494.
18. Rose K, Byrick RJ, Cohen MM. Planned and unplanned postoperative admission to critical care for mechanical ventilation. *Can J Anaesth* 1996; 43: 333-340. www.anesthesiology.org/pt/re/anes/fulltext.00000542-199604000-00003. htm.
19. Bhat SA, Shinde VS, Chaudhari LS. Audit of intensive care unit admissions from the operating room. *Indian J Anaesth* 2006; 50: 193-200. medind.nic.in/iadt06/i3/iadt06i3p193.pdf.
20. Cullen DJ, Nemeskal AR, Cooper JB. Effect of pulse oximetry, age and ASA physical status on the frequency of patients admitted unexpectedly to a post-operative intensive care unit and the severity of their anaesthesia related complications. *Anesth Analg* 1992; 74: 181-188. http://www.ncbi.nlm.nih.gov/pubmed/1731535?ordinalpos=2&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum.
21. Wilson RM, Runciman WB, Gibberd RW, Harrison BT, Newby L, Hamilton JD. The Quality in Australian Health Care Study. *Med J Aust* 1995; 163: 458-471. www.ncbi.nlm.nih.gov/pubmed/7476634.
22. Leape LL, Brennan TA, Laird N, et al. The nature of adverse events in hospitalized patients. Results of the Harvard Medical Practice Study II. *N Engl J Med* 1991; 32: 377-384. http://www.ncbi.nlm.nih.gov/pubmed/1824793?ordinalpos=1&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum.



The Critical Care Society
of Southern Africa

Critical Care Congress 2010 • 13-17 October
Champagne Sports Resort • Central Drakensberg • South Africa

Contact the Congress Office for further information: Sue McGuinness Communications & Event Management
Tel +27 (0)11 447 3876 • Fax +27 (0)11 442 8094 • Email: suemc@icon.co.za • www.criticalcare.org.za