With this issue, the AANA Journal's fifteenth course has been completed. The course consisted of a six-part series, beginning with the April 1995 issue and concluding in the February 1996 issue. The series was published as follows:

- Part I—(April 1995)—Perioperative therapeutic aerosol administration
- Part II—(June 1995)—Anesthetic considerations in the burn patient
- Part III—(August 1995)—Medical gases, hospital pipelines, and medical gas cylinders: How safe are they?
- Part IV—(October 1995)—Pulmonary aspiration revisited: Changing attitudes toward preoperative fasting
- Part V—(December 1995)—Teaching fiberoptic endoscopy and intubation
- Part VI—(February 1996)—Carbon monoxide poisoning: Role of the anesthesia machine's carbon dioxide absorption system

Each article included objectives for the reader and sources for reference and study.

The examination printed in this issue incorporates material from all six articles. The examination consists of 60 multiple-choice questions, 10 questions from each article. The examination is clearly marked as to which questions refer to which article. Remember, as you are taking the examination, you are free to refer to the original articles. Note also that there is but one correct answer to be marked for each question.

About your Continuing Education Credit...

To ensure that a certain level of knowledge has been attained, a minimum of 70% correct answers (42 out of 60) must be achieved. A total of 6 hours of Continuing Education (CE) Credit will be awarded for the successful completion of the examination; partial continuing education will not be awarded.

Only those passing the examination will be notified by mail of the successful completion of the course. (The time of this mailing will be dependent on the volume of response; however, notification will be effected prior to the close of the CE Year—July 31, 1996.) AANA members will automatically have their 6 CE Credits recorded for them. Individuals with record-keeping contracts through the AANA will also have the credits recorded for them.

The correct answers to the examination will appear in the August 1996 issue of the AANA Journal. By keeping a copy of your answers, you will automatically be able to see how you scored.

How to fill out the answer sheet... evaluation sheet...

It is recommended that you first mark your answers on the examination itself (so that you have your own record). Then, transfer your answers in pencil to the answer sheet, which appears on the adjacent page. Be sure to include your name, address, and AANA identification number. You are required to fill out an evaluation of the course which is printed on the reverse side of the answer sheet. (Non-AANA members should include a $30 processing fee—payable to the AANA: Journal Course—along with their examination answer sheet.)

Important deadline...

The examination answers must be postmarked by June 30, 1996. Adequate time must be allowed for the examination to be processed to ensure that all CE Credits are recorded prior to the end of the CE year. Mail your answer sheet to:

American Association of Nurse Anesthetists
222 South Prospect Avenue
Park Ridge, Illinois 60068-4001
Attn: AANA Journal Course

Much success...

We hope that you have found this fifteenth AANA Journal course to be of value. We wish you well in its successful completion.
Please PRINT.

Name: ____________________________

(last) ____________________________________________ (first) ____________________________________________ (middle) 

Address: ____________________________________________

(street) ____________________________________________ (city) ____________________________________________ (state) ____________________________________________ (zip code) ____________________________________________

AANA Membership ID Number: ____________________________

Time required to complete this examination: ____________________________ minutes

☐ If you are not an AANA member, check here. Be sure to enclose your $30 processing fee payable to AANA.

Please circle one response for each question.

For example, 36. 1 2 3 4 would indicate that the third alternative was chosen in response to question 36. Please erase completely any changed responses.

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AANA Code No.: 18732; Expiration date: July 31, 1996

To ensure that your examination will be processed, mail this examination answer sheet with the three-page evaluation to: American Association of Nurse Anesthetists, 222 South Prospect Avenue, Park Ridge, Illinois 60068-4001. Attn: AANA Journal Course
AANA Journal Course—No. 15—1996
Evaluation Form

Please evaluate the AANA Journal Course in each of the categories listed below. Circle the number that corresponds with the rating scale.

1 = Poor  2 = Fair  3 = Average  4 = Very Good  5 = Excellent

A. Content (Parts I-VI)

1. Based on current professional information. ........................................... 1 2 3 4 5
2. Level appropriate for identified intended audience. ............................. 1 2 3 4 5
3. Corresponds with learner objectives identified at beginning of each part. ................................................................. 1 2 3 4 5

B. Teaching Methods (Parts I-VI)

1. Self-test questions facilitated the learning process. ........................... 1 2 3 4 5

C. Relevancy to Practice (Parts I-VI)

1. Information presented can be applied to my practice. ........................ 1 2 3 4 5
2. Information provided is helpful in achieving my personal goals. .......... 1 2 3 4 5

D. Faculty/Objectives

Part I: Perioperative therapeutic aerosol administration

<table>
<thead>
<tr>
<th>R.A. Marley</th>
<th>Content related to objectives</th>
<th>Content organized and easy to follow</th>
<th>Content relevant and current</th>
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Objectives

1.1 Describe factors relevant to aerosol particle deposition to the upper and lower airways. ........................................... 1 2 3 4 5
1.2 Describe three common types of aerosol-generating devices and how they function. ........................................... 1 2 3 4 5
1.3 Demonstrate and understand the purpose and benefits of interfacing a spacer with the metered dose inhaler. .................. 1 2 3 4 5
1.4 Explain the state-of-the-art techniques for therapeutic aerosol administration. ........................................... 1 2 3 4 5
1.5 Cite specific considerations for therapeutic aerosol delivery to mechanically ventilated patients. .......................... 1 2 3 4 5

Time required for reading and comprehension of Part I Journal course text: ____________ minutes

Journal of the American Association of Nurse Anesthetists
### Part II

**Anesthetic considerations for the burn patient**

<table>
<thead>
<tr>
<th>M.D. Creasman</th>
<th>M.J. Bradshaw</th>
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**Objectives**

1. Classify and calculate the extent of a burn wound.
2. Examine the pathophysiological effects of the burn wound as a unique form of trauma.
3. Analyze the pulmonary dysfunction caused by an inhalational injury and determine the anesthetic implications.
4. Compare and contrast the anesthetic considerations for the immediate resuscitation, debridement, and reconstructive phases of the burned victim.
5. Differentiate between the special considerations of thermal, chemical, and electrical burns.

**Time required for reading and comprehension of Part II Journal course text:** minutes

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### Part III

**Medical gases, hospital pipelines, and medical gas cylinders: How safe are they?**

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<th>W.C. Petty</th>
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**Objectives**

1. Provide examples of clinically relevant medical gas pipeline problems.
2. List common and uncommon gas cylinder events that might lead to patient and staff injury.
3. Describe the codes, standards, and guidelines associated with the use of medical gases supplied by cylinders and pipelines.
4. Understand the way in which oxygen and nitrous oxide are produced and packaged for use.
5. Appreciate the safety mechanisms that are available to mitigate against accidental cylinder and pipeline related incidents.

**Time required for reading and comprehension of Part III Journal course text:** minutes

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### Part IV

**Pulmonary aspiration revisited: Changing attitudes toward preoperative fasting**

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<tr>
<th>M.M. Haines</th>
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**Objectives**

1. Describe the major factors that influence the rate of gastric emptying.
2. List associated factors that may place a patient at an increased risk for pulmonary aspiration.
4. Examine the overall incidence and outcome of pulmonary aspiration.
5. Understand what effect the length of a clear liquid fast has on gastric pH and volume based on current preoperative fasting studies.

**Time required for reading and comprehension of Part IV Journal course text:** minutes
Part V
Teaching fiberoptic endoscopy and intubation

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<tr>
<th>C. Johnson</th>
<th>A.R. El-Ganzouri</th>
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Objectives

| 5.1 Understand the recommended protocol for developing mastery of fiberoptic endoscopy. | Not met | Met |
| 5.2 List the equipment necessary to perform fiberoptic endoscopy. | Not met | Met |
| 5.3 Describe the rationale for training involving the use of patients with normal airways. | Not met | Met |
| 5.4 Appreciate the foremost cause of failed fiberoptic intubation. | Not met | Met |
| 5.5 Develop an algorithm for the patient with a difficult airway which includes alternatives to traditional endotracheal intubation. | Not met | Met |

Time required for reading and comprehension of Part V Journal course text: __________________ minutes

Part VI
Carbon monoxide poisoning: Role of the anesthesia machine’s carbon dioxide absorption system

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<th>C. Altman</th>
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Objectives

| 6.1 Describe the physiochemistry of carbon monoxide. | Not met | Met |
| 6.2 Appreciate the signs and symptoms of carbon monoxide toxicity. | Not met | Met |
| 6.3 Understand the etiology of intraoperative-related carbon monoxide poisoning. | Not met | Met |
| 6.4 Know the steps that should be employed to decrease the likelihood of carbon monoxide production. | Not met | Met |
| 6.5 List the major interventions used in treating carbon monoxide poisoning. | Not met | Met |

Time required for reading and comprehension of Part VI Journal course text: __________________ minutes
AANA Journal Course No. 15 Examination
Update for nurse anesthetists

Please circle one response for each question.
After you have marked your answers on this examination, transfer them to the answer sheet provided.
Mail your answer sheet and evaluation form to:
American Association of Nurse Anesthetists
222 South Prospect Avenue
Park Ridge, Illinois 60068-4001
Attn: AANA Journal Course
The examination and evaluation must be postmarked by July 31, 1996.

1. Which is not an advantage of drug delivery via aerosol?
   1. precision in dosage appraisal and reproducibility
   2. specific to desired site of action
   3. smaller dosage necessary
   4. minimize systemic side effects

2. The optimum particle size for deposition into the alveolar region is:
   1. 4 pm
   2. 40 pm
   3. 50 pm
   4. 100 pm

3. Typical adult inspiratory flow rates approximate:
   1. 1 L/min
   2. 2 L/min
   3. 3 L/min
   4. 50 L/min

4. Disadvantages of jet nebulizers include all the following except:
   1. complex and not always easily portable
   2. longer treatment time
   3. propellant toxicity issue
   4. hygiene maintenance

5. The most popular method of delivering inhaled medication is with:
   1. a metered dose inhaler
   2. jet nebulizer
   3. atomizer
   4. O2-driven inspiratory nebulizer

6. Which is not an advantage of a metered dose inhaler?
   1. portable
   2. environmentally safe with chlorofluorocarbons
   3. shortened administration time
   4. accurate drug delivery

7. Spacers are most commonly utilized with:
   1. metered dose inhalers
   2. atomizers
   3. nebulizers
   4. insufflators

8. Generally about how much of the nebulized drug will reach the lower respiratory tract with metered dose inhalers or jet nebulizers?
   1. 8-12%
   2. 30-40%
   3. 80%
   4. 100%
9. Nasal breathing, high flow rates (60 L/min or >), and end-inspiratory pause, would be most desirable in achieving:
1. systemic drug administration
2. lower airway aerosol deposition
3. nasopharyngeal aerosol deposition
4. central airway aerosol deposition

10. The optimal position for a jet nebulizer within the ventilator circuit is:
1. an S-shape on the Y-piece
2. 1.5-3.0 feet proximal to the Y-piece on the inspiratory limb
3. anywhere on the expiratory limb
4. 1.5 feet distal to the "Y" piece on the expiratory limb

11. Burn injuries are classified according to the depth and extent of tissue destruction. A third degree burn is best described by which of the following statements?
1. destruction of epidermis, causing extreme pain and requiring skin grafting
2. destruction of epidermis and all dermal appendages, requiring skin grafting
3. destruction of epidermis and dermas, but dermal appendages are spared
4. destruction of all dermal layers, including muscle fascia

12. The most reliable direct indicator that a burn victim also may have sustained an inhalational injury is:
1. the patient was burned in a closed-space fire
2. the presence of singed facial and nasal hair
3. the patient complains of a dry, sore throat
4. the presence of head or neck burns

13. The Brooke, Parkland, and Massachusetts formula all employ what fluid in the first 24 hours:
1. D5W
2. normal saline
3. hypertonic saline
4. lactated Ringer's

14. Using the illustration in Figure 2, what is the percent of body surface area involvement in a patient with an anterior thorax burn:
1. 5%
2. 10%
3. 15%
4. 21%

15. Considerations unique for the patient with electrical burn injury include all of the following except:
1. acute renal tubular necrosis from myoglobinuria
2. extensive cardiac evaluation
3. documentation of neurological injury
4. hyperalimentation

16. Considerations for transporting burned patients to and from the operating room include:
1. adequate analgesia and sedation
2. caution in the aseptic care and handling of intravenous lines
3. maintenance and conservation of body temperature
4. all of the above

17. Estimation of blood loss and the need for blood replacement during a burn debridement and grafting procedure is best accomplished by:
1. visual estimates of the surgical field
2. established formulas based upon the percent of body surface area excised and grafted
3. weighing sponges and monitoring suction canisters
4. evaluating urinary output, hemodynamics, and hemoglobin concentrations

18. In burned patients, the pharmacodynamics and pharmacokinetics of anesthetic and adjunct drugs are altered by all of the following except:
1. changes in cardiac output
2. hyposensitivity of dopamine receptors
3. hepatic and renal clearance
4. volume of distribution changes

19. Which of the following statements is not valid regarding the use of opioids in anesthesia for burned patients?
1. burned patients are resistant to the effects of opioids
2. opioid techniques offer the advantage of postoperative pain control
3. opioids may be used as part of a coinduction technique with sedative/hypnotics
4. opioid analgesics are required by most, if not all, burned patients
20. Regarding the use of muscle relaxants in anesthesia for burned patients, which of the following statements is true?
1. muscle relaxants are a necessity for intubation and maintenance of anesthesia
2. burned patients will require the same dosages of nondepolarizing muscle relaxants as non-burned patients
3. depolarizing muscle relaxants, such as succinylcholine, are best avoided in burned patients
4. nondepolarizing muscle relaxants may be used without regard for neuromuscular function monitoring

21. The number of known pipeline deaths in the United States from 1972 to 1993 was
1. 1
2. 2
3. 5
4. 45

22. Examples of threats to patient safety due to gas cylinder problems include:
1. misfilled cylinder
2. missing pins in yoke pin index safety system
3. overfilling of tanks and malfunctioning reducing valve
4. all of the above

23. Why are rules and regulations coming from a federal agency published in the Federal Register?
1. it allows the public time to respond to it before it becomes law
2. it defines the use of a drug or apparatus in terms of the European Standard
3. the Federal Register lists mortality associated with apparatus
4. none of the above

24. The definition of a medical gas is:
1. A gas with at least one beneficial quality
2. A gas with certain medicinal qualities
3. A gas manufactured, packaged, or intended for patient use
4. A gas capable of exerting therapeutic benefit

25. Violations of the Federal Food, Drug and Cosmetic Act are published in:
1. The Compressed Medical Gas Guideline
2. the FDA Enforcement Report
3. the U.S. Pharmacopeia
4. the Federal Medical Practice Violations Newsletter

26. The commonest source of manufactured oxygen is:
1. nuclear fusion
2. harvesting from plants
3. the fractional distillation of liquid air
4. harvesting from trees

27. Select the false statement:
1. oxygen boils at -183.0°C
2. a high pressure E cylinder has an empty volume of 4.8 L
3. a properly filled E cylinder of N₂O will deliver 2,600 L of gas
4. N₂O has a critical temperature of 36.5°C

28. Medical air must contain:
1. 0% carbon dioxide, 0% carbon monoxide, exactly 21% oxygen
2. 19.5-23.5% oxygen and less than 0.05% carbon dioxide
3. Exactly 21% oxygen and less than 0.0001% carbon dioxide
4. 100% oxygen

29. Medical gas pipeline must:
1. have a lengthwise seam no more than 1 mm wide
2. be less than 1.27 cm in diameter for the main pipelines
3. have ends that are copper brazed with welding only by qualified technicians
4. hangers for copper tubing must be made of iron

30. In what year was the diameter index safety system developed?
1. 1939
2. 1959
3. 1969
4. 1979
31. Gastric emptying of clear liquids in the healthy patient has a half-life of approximately:
   1. 5 minutes
   2. 12 minutes
   3. 30 minutes
   4. 60 minutes

32. Critical values that have been cited for developing Mendelson's syndrome are:
   1. pH 3.0; volume .6 mL/kg
   2. pH 2.5; volume .8 mL/kg
   3. pH 2.5; volume .4 mL/kg
   4. pH 1.5; volume .4 mL/kg

33. The majority of risk for pulmonary aspiration is contained in what patient population?
   1. patients undergoing emergent surgery
   2. the aged
   3. ASA physical status I and II patients
   4. patients who have been on nothing by mouth (NPO) status less than 2 hours

34. Gastric emptying is inhibited when:
   1. osmolarity in the stomach is isotonic
   2. the duodenum is distended
   3. the stomach contains carbohydrates
   4. chyme contains low concentrations of acid

35. Which of the following is not a pathologic condition associated with delayed gastric emptying?
   1. Crohn's disease
   2. diabetic autonomic neuropathy
   3. preoperative administration of opiates
   4. pyloric stenosis

36. Select the true statement about methods of estimating residual gastric volume.
   1. scintigraphic scans and ultrasound are commonly used methods due to their ease and simplicity
   2. indirect dye dilution is the most accurate method
   3. blind aspiration is rarely used because of increased criticism of the inaccuracy of this technique
   4. blind aspiration has been shown to underestimate gastric residuals, especially in the obese patient

37. Pediatric patients may be at a higher risk for aspiration pneumonitis based on what finding?
   1. a large majority that present for surgery demonstrate a gastric pH less than 2.5
   2. pediatric patients appear to be more anxious
   3. pediatric patients do not adhere to NPO orders as strictly as adults
   4. most pediatric patients present to surgery with gastric volumes greater than .4 mL/kg

38. Which of the following conditions would least likely be associated with an increased risk of aspiration?
   1. intestinal obstruction
   2. esophageal pathology
   3. neurologic impairment
   4. anemia

39. Studies since 1990 demonstrate an incidence of aspiration of approximately:
   1. less than 5/10,000 anesthetics
   2. 5/10,000 anesthetics
   3. 10/10,000 anesthetics
   4. 15/10,000 anesthetics

40. The overall mortality after aspiration is in the vicinity of:
   1. 1/10,000
   2. 1/50,000
   3. 1/100,000
   4. 1/200,000

41. The authors of this Journal course argue that a minimum of how many fiberoptic intubations is required to achieve proficiency:
   1. 10
   2. 15
   3. 30
   4. 50

42. In establishing a protocol for learning fiberoptic intubation, which of the following was not deemed essential?
   1. practice on fresh cadavers
   2. background reading and attendance at a workshop on the procedure
   3. training on patients with normal airways
   4. supervision under the mentorship of an experienced instructor
43. Commonly manufactured fiberoptic scopes have:
1. fields of view of 55-100°
2. insertion cord lengths of 50-60 cm
3. working channel diameters of 1.2-2.6 mm
4. all of the above

44. As a general rule, the internal diameter of the smallest endotracheal tube through which a fiberscope will easily pass must be:
1. at least 1 mm larger than the largest diameter of the insertion cord
2. more than 2 mm larger than the largest diameter of the insertion cord
3. two times the largest diameter of the insertion cord
4. none of the above

45. Scopes are often cleaned with Cidex*, also known as:
1. ethyl-methyl alcohol
2. fluorinated benzopropene
3. glutaraldehyde
4. ovassaparin

46. A "normal" airway assessment would yield which of the following?
1. thyromental distance greater than or equal to 6.5 cm, Mallampati class I, body weight less than 90 kg
2. thyromental distance of 5.8 cm, Mallampati class II, body weight less than 90 kg
3. thyromental distance of 5.0 cm, Mallampati class III, body weight more than 100 kg
4. history of failed intubation, inability to approximate buck teeth

47. Which of the following are the most common problems encountered in teaching fiberoptic intubation?
1. not introducing scope at the midline, cannot advance endotracheal tube over the scope into trachea
2. not enough volunteer patients, uncooperative patients
3. failed intravenous induction, wrong use of induction drugs
4. equipment failure, light source disconnect

48. The foremost cause of failed fiberoptic intubation is:
1. equipment failure
2. fog on lens
3. inexperience
4. bleeding

49. During difficult fiberoptic intubation, the tongue and epiglottis can be elevated by all of the following except:
1. jaw thrust maneuver
2. pull tongue forward by grasping it
3. use of laryngoscope to elevate structures
4. positive pressure via facemask

50. The algorithm for approaching the patient with a known difficult airway begins with:
1. nondepolarizer plus thiopental
2. succinylcholine plus propofol
3. awake fiberoptic intubation
4. blind nasal intubation after paralysis

51. Carbon monoxide is:
1. garlic tasting
2. yellow in color
3. pungent
4. nonirritating

52. Metabolically, we produce about how much carbon monoxide each day?
1. 6 mg
2. 10 grams
3. 100 grams
4. 200 grams

53. Inhaled carbon monoxide combines with hemoglobin to form:
1. carbon trioxide
2. carbon tetra-oxide
3. carboxyhemoglobin
4. acetic acid

54. Carbon monoxide tends to "shift" the oxyhemoglobin dissociation curve in what manner:
1. rightward
2. upward
3. downward
4. leftward
55. Cardiovascular collapse and death generally occur, even in healthy patients, as carboxyhemoglobin levels approach:
   1. 10%
   2. 20%
   3. 30%
   4. 60%

56. Typically, the first symptom of carbon monoxide poisoning in awake patients is:
   1. headache
   2. asystole
   3. hypoventilation
   4. hypotension

57. Carbon monoxide production appears to be related in what way to the water content of the CO₂ absorbent?
   1. inversely
   2. directly
   3. exponentially
   4. not related at all

58. The major factors related to anesthesia circuit carbon monoxide accumulation appear to be all of the following except:
   1. temperature
   2. water content of absorbent
   3. anesthetic agent
   4. gender of the patient

59. Select the true statement related to preventing carbon monoxide accumulation:
   1. absorbents with very low H₂O content are best
   2. soda lime is preferred over barium hydroxide absorbent
   3. No effective interventions are available
   4. high fresh gas flows should be used even during periods of disuse

60. The initial but definitive therapy for carbon monoxide poisoning involves:
   1. use of an oxygen enriched environment
   2. use of vasopressors
   3. neutralization with vitamin B₁₂
   4. blood transfusion

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3. Prseacy Calegee, C. Etomidate has been shown to have an embryocidal effect in ity butitis occasionaly judged... incidence (1.2% to 42%). This pain is usually described as mild to moderate in sever- fest venous pain on injection.

1. Carcinogenesis, mutagenesis, iarpainnent of portion

PRECAUTIONS

ADMINISTRATION BY PROLONGED INFUSION.

TISOL AND ALDOSTERONE PRODUCTION, THIS FORMULATION IS NOT INTENDED FOR COMPLICATIONS ENCOUNTERED DURING THE CONDUCT OF GENERAL ANESTHESIA.

INTRAVENOUS ETOMIDATE SHOULD BE ADMINISTERED ONLY By PERSONS TRAINED date in obstetrics, inclading Caesarean section deliveries. Therefore, such use is nut also be placed into three groups by location:

WARNINGS 4.

CONTRAINDICATIONS

short operative procedures such as dilation and curettage or carvical conization. b. Increase slightly the number of stillborn fetuses in rats at 0.3 and 1.25 mg/kg was

shetic agents, such as nitrsus onide in oxygen, during maintenance of anesthesia for dosag). No clear dose-related pottem was obuerved. severity

skeletal muscle movements (see ADVERSE REACTIDNSj. a.

Etomidate is indicated by intravenous injection

INDICATIONS AND USAGE

Intravenous etomidate is also indicated

for

anesthesia in patients below the age of ten (10) years; therefore, such etomidate in about

There are inadequate data to make dvsage recommendations for 1. Transient venous pain was observed immediately

of feaiility Nstress, exogenous replacement shuld be considered. activity uf

fertility in male and female rats when

was The most frequent adverse reactions associated with use of intravenous etomidate are thetized patient (averting movements). Any muscle group or groups may be

etomidate and

was notasso-

movements

are described as

have been shown to: 2. Transient skeletal muscle movements were noted following

injection of etomidate in about 32% of the patients, with considerable difference in the reported inci-

dence (22.7% to 65%). Most of these observations were judged mild to moderate in severity but some were judged disturbing. The incidence of disturbing movements was less when 0.1 mg of fentanyl was given immediately before induction. These movements have been classified as myoclonic in the majority of cases (74%), but aortovascular movements (7%), tonic movements (10%), and eye movements (14%) have also been reported. No exact classification is available, but these movements may also be placed into three groups by location:

a. Most movements are bilateral. This arms, legs, shoulders, neck, chest, wall, trunk and all four extremities have been described in some cases, with one or more of these muscle groups predominating in each individual case. Results of electro-

encaphlographic studies suggest that these muscle movements are a manifesta-

tion of dislocation of cervical activity, cortical electromyograms, taken during periods when these muscle movements were observed, have failed to reveal seizure activity.

b. Other movements are described as either unilateral or having a predominance of activity of one side over the other. These movements sometimes resemble a local-

ized response to some stimuli, such as venous pain on injection, in the lightly ana-

esthetized patient (waving movements). Any muscle group or groups may be involved, but a predominance of movement of the arm in which the intravenous infusion is started is frequently noted.

c. Still other movements probably represent a mixture of the first two types. Skeletal muscle movements appear to be more frequent in patients who also mani-

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