An audit on preoperative noncardiac surgery fitness evaluation in Assiut University Hospital for Children

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Received 16 September 2019
Revised 16 October 2019
Accepted 21 October 2019
Published 16 May 2020

Journal of Current Medical Research and Practice

2020, 5:191–196

Background
Surgery is a main event in an individual's life. The full surgical episode is known as perioperative interval. Perioperative process in general includes three stages: preoperative, intraoperative, and postoperative. The first stage (preoperative) includes giving of nursing care to the patients who are planned to undergo surgery. It was evident that through this stage, evaluation and education of the patient are the main responsibility of health service providers to have better results of the patients.

Objective
The purpose of the study was to assess the methods of performing preoperative fitness assessment for noncardiac patients in Assiut University Hospital for Children, to compare these methods with the standard methods, to confirm what is necessary and bypass needless investigations, and to provide a reference framework for the preoperative evaluation of children.

Patients and methods
The study was conducted at Assiut University Children Hospital. Data of children who attended the outpatient fitness assessment clinic during a 6-month period were collected and analyzed, and their management was compared with the standard management guidelines. All patients attended the outpatient fitness clinic during 6 months from 1 November 2017 to 30 April 2017. The authors collected all cases that attended the outpatient fitness clinic for surgery except cardiac surgeries.

Conclusion
It was concluded that preoperative blood tests are unnecessary in American Society of Anesthesiologists grade-1 patients undergoing minor/moderate surgery. A main cause of overtesting is the belief between junior staff that consultants wanted them or simply by habit. When compared with surgeon-ordered testing, anesthesiologist-ordered testing was more focused and less costly. There is a requirement to have guidelines for indicated tests in different groups of diseases and procedures to be ordered by the physicians to prevent unnecessary loss of time, money, and resources and to bypass overburdening laboratory staff.

Keywords:
fitness for surgery, preoperative care, preparation for anesthesia

J Curr Med Res Pract 5:191–196

2357-0121

Introduction

Surgery is a main event in an individual's life. The full surgical episode is known as perioperative interval. Perioperative process in general includes three stages: preoperative, intraoperative, and postoperative. The first stage (preoperative) includes giving of nursing care to the patients who are planned to undergo surgery. It was evident that through this stage, evaluation and education of the patient are the main responsibility of health service providers to have better results of the patients [1].

Sufficient preoperative preparation is one of the most important components toward successful result of surgical process, as preoperative assessment is obligatory before any diagnostic or therapeutic procedures that are required before anesthesia [2].

The preoperative evaluation is an important interaction between the patient and physician. This facilitates the surgeon to estimate the medical condition and health status of the patient and to determine risk factors, if any, against the procedure [3].

The preoperative evaluation providing elements to select the most appropriate and individualized anesthetic plan includes the process of assessment of the patient's clinical condition, which is intended to define the physical status classification, eligibility for anesthesia, and the risks associated with it [2].

It is important to note that evaluation of the clinical condition of the patient and study of intraoperative

events showed that some serious incidents result from poor preoperative evaluation. Preoperative assessment is performed to ensure comfort and safety to patients and improve operating room performance [4].

Preoperative evaluation minimizes the risk of cancellations by ensuring that all essential resources and discharge requirements are identified and co-coordinated, and it ensures that the patient is as fit as possible for the surgery and anesthesia. It also establishes that the patient is fully informed and wishes to undergo the procedure [5].

Preoperative evaluation service improves the patient's experience of their hospital admission and may reduce complications and mortality. Good communication and a team work are vital in the preoperative period. Complications and malpractice lawsuits are often owing to poor preparation and failures in communication. The preoperative visit may relieve anxiety and answer questions about both the anesthetic and surgical procedures [6].

The indistinctive and routine testing is unnecessary and involves, in addition to the cost for the institution, the possibility of false positive results with more or less serious consequences for patients. The selection of preoperative laboratory investigations including specific and imaging tests should be performed as a complementary measure to the clinical suspicion [6].

Many apparently healthy people are tested before procedure to check for undetected conditions that might affect their management. This can supply a benefit where test results yield more information that cannot be obtained from a patient history and physical examination alone. Even genuinely abnormal results often do not result in any significant change in perioperative process in relatively healthy people [7].

Surgical severity score

It is as follows:

(1) Grade 1: minor procedures, for example, diagnostic endoscopy without biopsy taking, fundus examination, spring catarrh, and circumcision.
(2) Grade 2: moderate procedures, for example, inguinal hernia repair, adenotonsillectomy, and knee arthroscopy.
(3) Grade 3: severe procedures, for example, ligament reconstructions and abdominal surgery.
(4) Grade 4: major procedures, for example, major hip surgery for a child with comorbidities and gut resection. It also includes prolonged surgical procedures, and those in which there are large fluid shifts, significant blood loss, or unstable hemodynamic situations.

Aim

The purpose of the study was to assess the methods of performing preoperative fitness for noncardiac patients in Assiut University Hospital for Children, to compare these methods with the standard methods, to confirm what is necessary and avoid unnecessary investigations, and to provide a framework reference for the preoperative evaluation of children.

Patients and methods

Settings

The study was conducted at Assiut University Children Hospital. Ethics approval Approved by committee of ethics assiut university faculty of medicine.

Methods

Data of children who attended the outpatient fitness assessment clinic during a 6-month period were collected and analyzed, and their management was compared with the standard management guidelines. This was a clinical audit study.

Study participants

Inclusion criteria

All patients who attended the outpatient fitness clinic during the 6 months from 1 Novermber 2017 to 30 April 2017 were included.

Exclusion criteria

Patients who attended the outpatient fitness assessment clinic for cardiac surgeries were excluded.

Sample size calculation

All cases that attended for outpatient fitness clinic for surgery, except for cardiac surgeries, were recruited.

Results

In this research, we studied 200 cases, comprising 118 males and 82 females. Their ages ranged from 7 months to 15 years (Table 1).

In this research, we studied 200 cases. Their age classification was as follows: less or equal 1 year who should be asked about perinatal history represented 36 cases, more than 14 years (adolescents) who should asked about social history and possibility of pregnancy in females represented 18 cases (12 males and six

females), and in between 1 and 14 years represented 146 cases (Table 2).

In this research, we studied 200 cases who were prepared for surgery according to degree of severity of surgery: minor, 24 cases; moderate, 164 cases; and major, 12 cases (Table 3).

Minor procedures included fundus examination, spring catarrh, and circumcision. Moderate procedures were adenoidectomy, tonsillectomy, cataract, and herniectomy. Major procedures included pulmonary lobectomy, thyroidectomy, and kyphosis repair (Tables 4–6).

Discussion

In this research, we studied 200 cases, comprising 118 males and 82 females. Their ages ranged from 7 months up to 15 years.

Table 1 Demographic data of studied cases

Demographic data	*n*=200 [*n* (%)]
Sex	
Male	118 (59)
Female	82 (41)
Age	
Range	7 months to 15 years
Mean and SD	6.45±3.92

Table 2 Age classification of studied cases

	n=200 [*n* (%)]
Age	
≤1 year	36 (18)
Between 1 and 14 years	146 (73)
>14 years	18 (9)
Sex	
Male	12 (67)
Female	6 (33)

Table 3 Degree of surgery

Degree of surgery	*n*=200 [*n* (%)]
Minor	24 (12)
Moderate	164 (82)
Major	12 (6)

In this research, we studied 200 cases. Their age classification was as follows: less or equal 1 year who should be asked about perinatal history were 36 cases, more than 14 years (adolescents) who should asked about social history and possibility of pregnancy in females were 18 cases (12 males and six females), and in between 1 and 14 years 146 cases.

In this research, we studied 200 cases who prepared for surgery according to the degree of severity of surgery: minor, 24 cases; moderate, 164 cases; and major, 12 cases.

Minor procedures included fundus examination, spring catarrh, and circumcision. Moderate procedures were adenoidectomy, tonsillectomy, cataract, and herniectomy. Major procedures included pulmonary lobectomy, thyroidectomy, and kyphosis repair.

In this research we studied 200 cases.

Perinatal historyA total of 36 cases were equal or less than 1 year. Perinatal history was recorded in 22 cases and not in 14 cases.

More relevant in infants in which gestational age at birth may impact anesthetic procedure. Ex-premature babies are more complexed.

Previous anesthesia

Of the 200 cases, previous anesthesia was recorded in 196 cases and not in four cases.

Previous anesthetic charts were used to exclude previous problems with anesthesia.

Malignant hyperthermia and suxamethonium apnea should be eliminated.

Allergies

Of the 200 cases, allergies were recorded for 192 cases and not for eight cases.

Table 4 History of studied cases

History	Number of total cases for each	Recorded [*n* (%)]	Not recorded [*n* (%)]	Observations
Perinatal history	36	22 (61)	14 (39)	≤1 year
Previous anesthesia	200	196 (98)	4 (2)	
Allergies	200	192 (96)	8 (4)	
Medications	200	160 (80)	40 (20)	
Immunization	200	140 (70)	60 (30)	
Bleeding disorders	200	198 (99)	2 (1)	
Concurrent medical condition	200	160 (80)	40 (20)	
Social (smoking, alcohol, and drugs)	18	6 (33)	12 (67)	Of adolescents
Possibility of pregnancy	6	0 (0)	6 (100)	Of adolescent females
Family history	200	196 (98)	4 (2)	

Table 5 Examination of studied cases

Examination	Recorded [*n* (%)]	Not recorded [*n* (%)]
General appearance	200 (100)	0 (0)
Vital signs	180 (90)	20 (10)
Weight and height	150 (75)	50 (25)
Airway Ex.	190 (95)	10 (5)
Respiratory system	200 (100)	0 (0)
Cardiovascular system	196 (98)	4 (2)
Nervous system	190 (95)	10 (5)
Abdominal Ex.	194 (97)	6 (3)
Others (back, limbs, and genitalia)	120 (60)	80 (40)

Table 6 Investigations of studied cases

Investigations	Recorded (*n*=200) [*n* (%)]	Not recorded (*n*=200) [*n* (%)]
Complete blood count	200 (100)	0 (0)
Coagulation profile	200 (100)	0 (0)
Glucose	60 (30)	140 (70)
Plasma electrolytes	22 (11)	178 (89)
Kidney function tests	22 (11)	178 (89)
Liver function tests	10 (5)	190 (95)
Urine analysis	6 (3)	194 (97)
ECG	50 (25)	150 (75)
Chest radiography	8 (4)	192 (96)
Echocardiography	6 (3)	194 (97)
Others	0 (0)	200 (100)

Distinguishment between true allergies and common adverse effects should be done by accurate allergy history. Steroids and antihistamines may be needed for blood products for those who received numerous transfusions. Latex allergy should be noted.

Medication

Of 200 cases, medication was recorded for 160 cases and not for 40 cases.

Any chronic medications should be continued except for antidiabetic management, which needs an individualized plan.

Children can take oral medicines during the preoperative fasting as the total volume of fluids doesn't exceed 30 ml.

Immunization

Of the 200 cases, immunization was recorded for 140 cases and not 60 cases.

Diagnosis of surgery-associated complications may be difficult postoperatively owing to pyrexia or acute illness after recent immunization.

It is probably reasonable to postpone routine surgery 2 days after immunization with inactive vaccines and to be ready to delay surgery within 21 days of measles, mumps and rubella vaccine (MMR) if the child is unwell. However, there are no absolute contraindications to concurrent anesthesia and immunization

Bleeding disorders

Of 200 cases, bleeding disorders were recorded for 198 cases and not for two.

History of bleeding disorders should be asked to exclude occurrence of bleeding in surgery and to investigate about the cause.

Concurrent medical condition

Of 200 cases, concurrent medication condition was recorded for 160 cases and not for 40 cases.

Medical conditions should be optimized especially upper respiratory tract infections, gastrointestinal upsets, and infectious diseases such as chicken pox.

It is also important to exclude any recent illnesses, which may increase the risk of anesthesia on the day.

Social (smoking, alcohol, and drugs)

A total of 18 cases were adolescents. Among whom, smoking, alcohol, and drug use was recorded for six cases and not for 12 cases.

Smoking, alcohol, and drug intake should be asked as it affects the general condition and anesthesia.

Possibility of pregnancy

A total of six cases female adolescents. Possibility of pregnancy was recorded in zero case and not recorded in all six.

Adolescent girls should to be asked about pregnancy possibility, and pregnancy test may be performed.

Family history

Of 200 cases, family history was recoded for 196 cases and not for four cases.

Information should be obtained on whether there has been a family history of malignant hyperthermia, bleeding disorders, unexplained deaths, neuromuscular disease, or passive smoking.

General appearance

Of 200 cases, general appearance was recoded for 200 and not for zero cases.

General appearance is important, such as activity, color, and general look.

Vital signs

Of 200 cases, vital signs were recoded for 180 cases and not for 20 cases. These involved pulse, temperature, oxygen saturation in air, and blood pressure.

Weight and height

Of 200 cases, weight and height were recoded for 150 cases and not recorded for 50 cases.

Weight and height guide the selection of appropriate anesthetic equipment and allow calculation of drug and fluid needs.

Children with type 2 diabetes, asthma, gastric reflux, obstructive sleep apnea, mental health disorders, and musculoskeletal problems have more obesity-related comorbidities.

Airway examination

Of 200 cases, airway examination was recorded for 190 cases and not recorded for 10 cases.

It is required for potential difficult intubations and loose teeth.

Respiratory system

Of 200 cases, respiratory system examination was recorded for 200 cases and not recorded for cases, for blocked nasal airway, purulent nasal secretions, shortness of breath, cough, and dyspnea on exertion, smoker, and use of inhalers.

Cardiovascular system

Of 200 cases, cardiovascular system examination was recorded for 196 cases and not recorded for four cases. Auscultation of heart and examination of peripheral veins should be done. Undiagnosed heart murmur may be detected.

Nervous system

Of 200 cases, nervous system examination was recorded for 190 cases and not for 10 cases. It was done to detect preoperative anxiety, increased intracranial pressure including obstructive hydrocephalus, and seizures.

Abdominal examination

Of 200 cases, abdominal examination was recorded for 194 cases and not recorded for six cases.

It was done for abdominal masses, previous scars, and reflux symptoms.

Others

Of 200 cases, other examinations of back, limbs, and genitalia were recorded for 120 cases and not recorded for 80 cases.

These included skeletal malformations such as kyphoscoliosis and other abnormalities in back, limbs, and genitalia.

Complete blood count

Of 200 cases, complete blood count was recorded for 200 cases and not recorded for zero cases.

The incidence of anemia in children is rare and occurs more easily in infants. Furthermore, the presence of a certain level of anemia mostly does not affect the decision to proceed with surgery.

In all cases, the decision was based on clinical factors and not on the value of preoperative hemoglobin only.

Children with known or suspected anemia and all patients undergoing potentially bleeding surgical cases and major surgeries are recommended to do complete blood picture.

Coagulation profile

Of 200 cases, coagulation profile was recorded for 200 cases and not for zero cases.

Accurate anamnesis of the patient and her/his relatives with structured questionnaires and a careful physical examination are key elements before any invasive procedure to anticipate bleeding disorders.

Unless there are specific risk factors in the history and physical examination or in case of a potentially bleeding surgery, routine use of coagulation tests is not recommended.

Glucose

Of 200 cases, glucose level was recorded for 60 cases and not recoded for 140 cases.

The risk of hypoglycemia is minimal in the child, even after prolonged fasting shown by numerous studies. The determination of blood glucose level days before surgery is not able to predict glycemia at the time of induction.

Plasma electrolytes

Of 200 cases, plasma electrolyte levels were recorded for 22 cases and recorded for 178 cases.

It should be required only in the presence of digestive disorders, alterations in acid-base, or use of diuretics.

Kidney function tests

Of 200 cases, kidney function tests were recorded for 22 cases and not recorded for 178 cases.

It should be required only in the presence of digestive disorders, alterations in acid-base, or use of diuretics.

Liver function tests

Of 200 cases, liver function test were recorded for 10 cases and not for 190 cases. These test examine, is there a clotting problem? Does the patient have any underlying malnutrition? This may affect the patient's ability to heal.

Urine analysis

Of 200 cases, urine analysis was recorded for 6 cases and not recorded for 194 cases.

It is not routine to offer urine dipstick tests before procedure.

If the presence of a urinary tract infection would affect the decision of surgery, consider microscopy and culture of midstream urine sample before surgery.

ECG

Of 200 cases, ECG was recoded for 50 cases and not recorded 150 cases.

ECG should be done for heart murmurs, suspecting of congenital heart diseases, obstructive sleep apnea syndrome, bronchopulmonary dysplasia, and cardiovascular surgeries.

Moreover, it should be done in all cases under six months of age to exclude congenital heart diseases.

Echocardiography

Of 200 cases, echocardiography was done for six cases and not for 194 cases.

It is done for pre-excitation on the ECG. It is recommended in order to rule out cardiac anomalies.

If the person has a heart murmur and any cardiac symptom including chest pain, breathlessness, pre syncope, syncope, or signs or symptoms of heart failure, consider resting echocardiography.

Chest radiography

Of 200 cases, chest radiography was recorded for eight cases and not recorded for 192 cases.

It should be done for risk factors in history or physical examination (e.g. mediastinal mass, bronchopulmonary dysplasia, severe asthma, and neuromuscular diseases) and cardiovascular surgery.

Others

Of 200 cases, others were recorded in zero cases and not recorded in 200 cases.

Conclusion

Preoperative blood tests are unnecessary in American Society of Anesthesiologists grade-1 patients undergoing minor/moderate surgery. The main cause of overtesting is the belief between junior staff that consultants wanted them or simply by habit. When compared with surgeon-ordered testing, anesthesiologist-ordered testing was more focused and less costly. There is a requirement to have guidelines for indicated tests in different groups of diseases and procedures, to be ordered by the physicians to prevent unnecessary loss of time, money, and resources and to bypass overburdening laboratory staff.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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