

World Database for Pediatric and Congenital Heart Surgery

Appendix F: Pre-Operative Risk Factors

Cardio-pulmonary resuscitation

Chest compression took place during the 48 hours prior to OR Entry Date and Time, or at the time of OR Entry Date and Time.

Coagulation Disorder

Evidence of a PT/PTT above normal. Thrombocytopenia <100,000, or Fibrinogen split products positive (>10%) and the coagulopathy is NOT secondary to medications such as Heparin or Warfarin.

Diabetes mellitus

Evidence of insulin dependent diabetes mellitus as manifested by the fact that the patient has the diagnosis of diabetes mellitus that is controlled with insulin or that is controlled with dietary modification with or without oral medications (oral antihyperglycemic agents).

Previous History of Endocarditis

Use the Duke Criteria for the Diagnosis of Infective Endocarditis (IE): The definitive diagnosis of infective endocarditis requires one of the following four situations: 1) Histologic and/or microbiologic evidence of infection at surgery or autopsy such as positive valve culture or histology; 2) Two major criteria; 3) One major criterion and three minor criteria; 4) Five minor criteria. The two major criteria are: 1) Blood cultures positive for IE 2) Evidence of endocardial involvement. Blood cultures positive for IE requires: 1) Typical microorganism consistent with IE isolated from 2 separate blood cultures, as noted in number two below (viridans streptococci, *Streptococcus bovis*, *Staphylococcus aureus*, or HACEK group [HACEK, *Haemophilus* species {*H. aphrophilus* and *H. paraaphrophilus*}, *Actinobacillus actinoinyctemcomitans*, *Cardiobacterium hominis*, *Eikenella corrodens*, and *Kingella kingae*.]) or (Community-acquired enterococci in the absence of a primary focus); 2) Microorganisms consistent with IE isolated from persistently positive blood cultures defined as: (At least 2 positive cultures of blood samples obtained > 12 hours apart) or (All of 3 or a majority of 4 or more separate cultures of blood, the first and the last sample obtained > 1 hr apart); 3) Single blood culture positive for *Coxiella burnetii* or an antiphase I IgG antibody titer of >1 :800. Evidence of endocardial involvement requires 1) Positive results of echocardiography for IE defined as: (Oscillating intracardiac mass on the valve or supporting structures in the path of regurgitant jets or on implanted material in the absence of an alternative anatomic explanation) or (Abscess) or (New partial dehiscence of a valvar prosthesis) or 2) New valvar regurgitation (worsening or changing or preexisting murmur not sufficient). The six minor criteria are: 1) Predisposing heart disease or injection drug use (IVDA); 2) Temperature of > 38C; 3) Vascular phenomenon (major arterial emboli, septic pulmonary infarcts, mycotic aneurysm, intracranial or conjunctival hemorrhage, Janeway's lesions); 4) Immunologic phenomenon (glomerulonephritis, Osler's nodes, Roth's spots, rheumatoid factor); 5) Microbiologic evidence (a positive blood culture that does not meet a major criterion as noted above) or serologic evidence of active infection with an organism consistent with IE; 6) Echocardiographic findings that are consistent with IE but do not meet a major criterion as noted above.

Endocrine Abnormalities

Hypothyroidism refers to decreased levels of triiodothyronine (T3) and thyroxine (T4), and reverse triiodothyronine (reverse T3), with high levels of thyroid-stimulating hormone (TSH). Symptoms of hypothyroidism include bradycardia, pericardial effusions, hypertension and a narrowed pulse pressure and myxedema. Studies have also shown decreases in cardiac output and cardiac contractility, decreased diastolic relaxation and diastolic filling. In those with congestive heart failure (CHF), decreased levels of T3 have been shown to be proportional to New York Heart Association class, poor outcomes, mortality, poor hemodynamics, and hyponatremia. This factor may be coded (1) if the TSH > 20 mU / liter, or (2) if the patient has pituitary failure with hypothyroidism, or (3) if the patient is receiving medication to treat hypothyroidism.

Failure to Thrive

Failure to thrive in childhood is a state of undernourishment due to inadequate caloric intake, inadequate caloric absorption, or excessive caloric expenditure.

Greater than 2 hospital admission for non-cardiac infections in the last 3 months

(Option added July 2, 2019)

Hepatic dysfunction

Hepatic dysfunction is defined as dysfunction of the liver that results in hypoalbuminemia (<2 grams/dL), coagulopathy (PT > 1.5 x upper limits of normal), and hyperbilirubinemia (> 3.0 x upper limits of normal). Select this factor if the patient develops 2 out of these 3 laboratory abnormalities.

Malnutrition: as noted by the clinician in the History & Physical

(Option added July 2, 2019)

Mechanical ventilation to treat cardiorespiratory failure

Supported with mechanical ventilation to treat cardiorespiratory failure during the hospitalization.

Q: Should this be selected if a patient was intubated at an outside hospital prior to coming to our hospital for surgery?

A: If the patient was intubated to treat respiratory failure, then you should indicate “yes” even if the patient was intubated at an outside hospital.

Necrotizing entero-colitis

Necrotizing enterocolitis is defined as an acute reduction in the supply of oxygenated blood to the small intestine or large intestine, typically resulting in acidosis, abdominal distention, pneumatosis, and/or intestinal perforation, that prompts initiation of antibiotics or exploratory laparotomy.

Neurological deficit

Indicate whether the patient had a stroke, CVA, or intracranial hemorrhage > Grade 2 at any time during the patient’s lifetime. A stroke is any confirmed neurological deficit of abrupt onset caused by a disturbance in blood flow to the brain, when the neurologic deficit does not resolve within 24 hours. An IVH (Intraventricular hemorrhage) is diagnosed by the existence of a neurologic imaging study indicating a new or previously unsuspected collection of

intraventricular hemorrhage that may extend to include an intraparenchymal component. A Grade 1 IVH requires the existence of a neurologic imaging study indicating a new or previously unsuspected collection of intraventricular hemorrhage with a limited germinal matrix involvement. A Grade 2 IVH requires the existence of a neurologic imaging study indicating a new or previously unsuspected collection of intraventricular hemorrhage that involves an area of up to, but not more than 50% of the ventricular cross-sectional area in sagittal view. A Grade 3 IVH requires the existence of a neurologic imaging study indicating a new or previously unsuspected collection of intraventricular hemorrhage that involves at least 50% of the ventricular cross-sectional area in sagittal view but not an intraparenchymal component. A Grade 4 IVH requires the existence of a neurologic imaging study indicating a new or previously unsuspected collection of intraventricular hemorrhage that includes an intraparenchymal component extending beyond the germinal matrix.

Pacemaker present

A pacemaker is a medical device that uses electrical impulses, delivered by electrodes contacting the heart muscles, to regulate the beating of the heart. The purpose of a pacemaker is to maintain an adequate heart rate, either because the heart's native pacemaker is not fast enough, or there is a block in the heart's electrical conduction system.

Preoperative complete AV block

The absence of AV node conduction.

Preoperative/Preprocedural mechanical circulatory support (IABP, VAD, ECMO, or CPS)

Patient is supported with mechanical support, of any type (IABP, VAD, ECMO, or CPS), for resuscitation/CPR or support,

Renal dysfunction

Renal dysfunction is defined as the oliguria with sustained urine output < 0.5 cc/kg/hr for 24 hours and/or a rise in creatinine > 1.5 times upper limits of normal for age, without needing dialysis (including peritoneal dialysis and/or hemodialysis) or hemofiltration.

Renal failure requiring dialysis

Renal failure is defined as oliguria with sustained urine output < 0.5 cc/kg/hr for 24 hours and/or a rise in creatinine > 1.5 times upper limits of normal for age, with need for dialysis (including peritoneal dialysis and/or hemodialysis) or hemofiltration.

Respiratory Failure not requiring ventilation

Respiratory failure results from inadequate gas exchange by the respiratory system, meaning that the arterial oxygen, carbon dioxide or both cannot be kept at normal levels. A drop in the oxygen carried in blood is known as hypoxemia; a rise in arterial carbon dioxide levels is called hypercapnia.

Seizure

A seizure is defined as the clinical and/or electroencephalographic recognition of epileptiform activity.

Sepsis

Sepsis is defined as "evidence of serious infection accompanied by a deleterious systemic response". Sepsis may be diagnosed by the presence of a Systemic Inflammatory Response Syndrome (SIRS) resulting from suspected or proven infection. A systemic inflammatory response syndrome (SIRS) is present when at least two of the following criteria are present: hypo- or hyperthermia (>38.5 or <36.0), tachycardia or bradycardia, tachypnea, leukocytosis or leukopenia, and thrombocytopenia.

Shock, Persistent at time of surgery

Shock is a "clinical condition characterized by signs and symptoms which arise when the cardiac output is insufficient to fill the arterial tree with blood under sufficient pressure to provide organs and tissues with adequate blood flow."

Shock, Resolved at time of surgery

Shock is a "clinical condition characterized by signs and symptoms which arise when the cardiac output is insufficient to fill the arterial tree with blood under sufficient pressure to provide organs and tissues with adequate blood flow." This factor should be coded if shock was present at any time after the date and time of admission to the hospital but not at the time of OR Entry Date and Time, including situations where shock was present after admission to the hospital where this operation was performed, and situations where shock was present while the patient was hospitalized at another "transferring facility" that subsequently transferred the patient who ultimately arrived at this hospital in this same hospitalization.

Tracheostomy

The patient has a tracheostomy present

None

No pre-operative risk factors present

Other, Specify *(Option added July 9th, 2019)*