Extracorporeal Membrane Oxygenation (ECMO)

I. Description

Extracorporeal membrane oxygenation (ECMO) is defined as the use of a cardiopulmonary bypass circuit for temporary life support for patients with potentially reversible cardiac and/or respiratory failure. ECMO provides a mechanism for gas exchange as well as cardiac support thereby allowing for recovery from existing lung and/or cardiac disease. ECMO is an accepted treatment modality for neonatal, pediatric and adult patients with respiratory and/or cardiac failure failing to respond to maximal medical therapy. It is initiated with the expectation that cardiorespiratory function will improve sufficiently to allow discontinuation of ECMO within two weeks.

ECMO can be venovenous (VV) or venoarterial (VA):

- VV ECMO provides respiratory support only. Blood is extracted from the vena cava or right atrium and returned to the right atrium.
- VA ECMO provides both respiratory and hemodynamic support. Blood is extracted from the right atrium and returned to the arterial system, bypassing the heart and lungs.

II. Criteria/Guidelines

A. Neonates:

ECMO is covered (subject to Limitations/Exclusions and Administrative Guidelines) for critically ill newborns (age 28 days or younger) with respiratory failure after conservative management (medication and mechanical ventilation) is found to be ineffective and all of the following clinical criteria are met:

1. The newborn's gestational age is 34 weeks or more or a birth weight of 2,000 grams or more
2. The newborn has reversible lung disease
3. The newborn has not been on mechanical ventilation for more than 14 days and meets any of the following criteria:
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a. AaDO2 of 605 mm Hg or more for four to 12 hours (at sea level). AaDO2 = [(atmospheric pressure -47) - (PaCO2 + PaO2)]/FiO2
b. Oxygen index (OI) of 35 or more for 1/2 hour to six hours. OI = (MAP x FiO2 x 100)/PaO20
c. PaO2 of 50 mm Hg or less for two to 12 hours, despite maximum ventilatory assistance
d. Acidosis and shock with a pH of less than 7.25 for two hours or more or with intractable hypotension
e. Acute deterioration with a PaO2 40 mm Hg or less, despite aggressive intervention

4. Prior to ECMO or prior to transfer to an ECMO unit the following studies should be performed to assess patient status:
a. Cardiac evaluation by ultrasound to rule out uncorrectable heart disease
b. Head ultrasound (within 24 hours) to rule out significant (grade III and IV) intracranial hemorrhage
c. Coagulation status tests, (e.g., partial thromboplastin (PTT), prothrombin time (PT), fibrinogen, fibrin degradation products (FDP), platelet count)

B. Adults and Children:

ECMO is covered (subject to Limitations/Exclusions and Administrative Guidelines) for adults and children with acute severe cardiac or pulmonary failure that is potentially reversible after conservative management (medication and mechanical ventilation) is found to be ineffective. Clinical situations that may prompt the initiation of ECMO include the following:

1. Hypoxemic respiratory failure with a ratio of arterial oxygen tension to fraction of inspired oxygen (PaO2/FiO2) of <100 mmHg despite optimization of the ventilator settings, including the tidal volume, positive end-expiratory pressure (PEEP), and inspiratory to expiratory (I:E) ratio
2. Hypercapnic respiratory failure with an arterial pH less than 7.20
3. Refractory cardiogenic shock
4. Failure to wean from cardiopulmonary bypass after cardiac surgery
5. As a bridge to either cardiac transplantation or placement of a ventricular assist device (VAD)

III. Limitations/Exclusions

A. ECMO is not known to be effective in improving health outcomes in patients with any of the following absolute contraindications:

1. Neonates with major intracranial hemorrhage (grade III and IV)
2. Neonates with uncorrectable cardiac lesions
3. Neonates with lethal congenital anomalies
4. Evidence of severe irreversible brain damage
5. Irreversible respiratory or cardiac failure

B. ECMO for patients with any of the following relative contraindications may be considered on a case by case basis:
1. When anticoagulation is contraindicated (e.g., bleeding, recent surgery, recent intracranial injury)
2. When mechanically ventilated for longer than seven days, for patients with respiratory failure
3. When a VAD or transplantation is contraindicated (e.g., the patient has preexisting renal failure, preexisting hepatic failure, significant aortic valve insufficiency, or inadequate social support), for patients with cardiac failure.
4. Other characteristics that may exclude some patients from receiving ECMO include advanced age, morbid obesity, neurologic dysfunction, or poor preexisting functional status

C. Standard durations with ECMO vary by condition. It is initiated with the expectation that cardiorespiratory function will improve sufficiently to allow discontinuation of ECMO within two weeks. ECMO should be discontinued if there is no hope for healthy survival (severe brain damage, no heart or lung recovery or no hope of organ replacement by VAD or transplant).

IV. Administrative Guidelines

A. Precertification is not required since ECMO is generally provided on an emergency basis.

B. HMSA reserves the right to perform retrospective review using the above criteria to validate if services rendered met payment determination criteria.

C. Supporting documentation must be submitted with the claim to be reviewed by a Medical Director if the patient receives ECMO services for more than 14 days or has a contraindication listed in Limitations/Exclusions B 1-4.

D. Applicable codes

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<tr>
<td>36822</td>
<td>Insertion of cannula(s) for prolonged extracorporeal circulation for cardiopulmonary insufficiency (ECMO) (Separate procedure)</td>
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<tr>
<td>33960</td>
<td>Prolonged extracorporeal circulation for cardiopulmonary insufficiency; initial 24 hours</td>
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<tr>
<td>33961</td>
<td>each additional 24 hours (List separately in addition to code for primary procedure)</td>
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<tr>
<th>ICD-9 Procedure Code</th>
<th>Description</th>
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<tr>
<td>39.65</td>
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E. ICD-10-PCS procedure codes are provided for your information. This will not become effective until 10/1/2014:

<table>
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V. Important Reminder

The purpose of this Medical Policy is to provide a guide to coverage. This Medical Policy is not intended to dictate to providers how to practice medicine. Nothing in this Medical Policy is intended to discourage or prohibit providing other medical advice or treatment deemed appropriate by the treating physician.

Benefit determinations are subject to applicable member contract language. To the extent there are any conflicts between these guidelines and the contract language, the contract language will control.

This Medical Policy has been developed through consideration of the medical necessity criteria under Hawaii’s Patients' Bill of Rights and Responsibilities Act (Hawaii Revised Statutes §432E-1.4), generally accepted standards of medical practice and review of medical literature and government approval status. HMSA has determined that services not covered under this Medical Policy will not be medically necessary under Hawaii law in most cases. If a treating physician disagrees with HMSA’s determination as to medical necessity in a given case, the physician may request that HMSA reconsider the application of the medical necessity criteria to the case at issue in light of any supporting documentation.

VI. References