Changes to Thoracic Aortic Aneurysm Procedures in 2020

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In 2019, the Current Procedural Terminology (CPT®) guidelines were revised in the Cardiovascular System/Heart and Pericardium Thoracic Aortic Aneurysm subsection to include required components that must be performed in order to report add-on code 33866 (aortic hemiarch graft procedure) in conjunction with the code series for ascending aortic graft. For CPT 2020, the guidelines have been additionally revised and new parenthetical notes have been added with instructions on the appropriate reporting of codes 33858-33871. Codes 33860 and 33870 have been deleted, and new codes 33858, 33859, and 33871 have been established. This article provides an overview of these changes.

Thoracic Aortic Aneurysm

33858
Ascending aorta graft, with cardiopulmonary bypass, includes valve suspension, when performed; for aortic dissection
33859
for aortic disease other than dissection (eg, aneurysm)

(33860 has been deleted. To report, see 33858, 33859)
33863
Ascending aorta graft, with cardiopulmonary bypass, with aortic root replacement using valved conduit and coronary reconstruction (eg, Bentall)

(Do not report 33863 in conjunction with 33405, 33406, 33410, 33411, 33412, 33413, 33858, 33859)
33864
Ascending aorta graft, with cardiopulmonary bypass with valve suspension, with coronary reconstruction and valve-sparing aortic root remodeling (eg, David Procedure, Yacoub Procedure)

(Do not report 33864 in conjunction with 33858, 33859, 33863)

33866

Aortic hemiarch graft including isolation and control of the arch vessels, beveled open distal aortic anastomosis extending under one or more of the arch vessels, and total circulatory arrest or isolated cerebral perfusion (List separately in addition to code for primary procedure)

(Use 33866 for aortic hemiarch graft performed in conjunction with ascending aortic graft [33858, 33859, 33863, 33864])

(Do not report 33866 in conjunction with 33871)

(33870 has been deleted. To report, use 33871)

33871

Transverse aortic arch graft, with cardiopulmonary bypass, with profound hypothermia, total circulatory arrest and isolated cerebral perfusion with reimplantation of arch vessel(s) (eg, island pedicle or individual arch vessel reimplantation)

(Do not report 33871 for aortic hemiarch graft)

(Do not report 33871 in conjunction with 33866)

(For aortic hemiarch graft performed in conjunction with ascending aortic graft [33858, 33859, 33863, 33864], use 33866)

Guidelines

The revised guidelines indicate that add-on code 33866 (aortic hemiarch graft) is not typically performed as a stand-alone procedure; however, it may be reported in conjunction with ascending aortic graft procedures, when performed.

When ascending aortic disease involves the aortic arch, an aortic hemiarch graft may be necessary in conjunction with the ascending aortic graft and may be reported with add-on code 33866 in conjunction with the appropriate ascending aortic graft code (33858, 33859, 33863, 33864). Aortic hemiarch graft requires all of the following com-ponents:

- Either total circulatory arrest or isolated cerebral perfusion (retrograde or antegrade);
- Incision into the transverse arch extending under one or more of the arch vessels (eg, innominate, left common ca-rotid, or left subclavian arteries); and
- Extension of the ascending aortic graft under the aortic arch by construction of a beveled anastomosis to the distal ascending aorta and aortic arch without a cross-clamp (an

open anastomosis).

An ascending aortic repair with a beveled anastomosis into the arch with a cross-clamp cannot be reported sepa-rately as a hemiarch graft using 33866. Use 33866 for aortic hemiarch graft when performed in conjunction with the ascending aortic graft codes 33858, 33859, 33863, 33864. Code 33871 describes a complete transverse arch graft placement and is not used to report an aortic hemiarch graft procedure.

New Codes

Codes 33858 and 33859 were created to differentiate ascending aortic repair procedures: (a) an ascending aorta graft with cardiopulmonary bypass including valve suspension, when performed, for aortic dissection (33858); and (b) an ascending aorta graft with cardiopulmonary bypass for aortic disease other than dissection, such as an ascending aortic aneurysm (33859). Prior to 2020, the coding for ascending aorta repair did not distinguish between repair for aortic dissection or repair of aortic diseases, such as a non-dissecting aneurysm or congenital anomalies, which are distinct pathologic processes that involve the aorta and require different physician work. With advances in surgical techniques that have evolved over the past few years, these new codes more clearly describe physician work involved in the repair of the ascending aorta for differing pathologic aortopathies. Code 33871 was created to describe a **complete** transverse aortic arch graft, which may be reported in conjunction with the ascending aortic graft codes (33858, 33859, 33863, 33864), when performed.

See the following clinical examples and descriptions that reflect the typical clinical situations in which codes 33858, 33859, and 33871 may be appropriately reported.

Clinical Example (33858)

A 62-year-old male presents to the emergency room (ER) with severe tearing pain in the chest. Transesophageal echo-cardiogram confirms an aortic dissection, and the patient is taken to the OR for ascending aortic graft repair.

Description of Procedure (33858)

Following a standard median sternotomy incision, divide the sternum with a saw. Determine which artery to use for arterial access while on cardiopulmonary bypass following median sternotomy and exposure of the heart and great vessels. This may require exposure and use of the aortic arch, innominate artery, subclavian artery, brachial artery, or even femoral artery, depending on the extent of the dissection and the condition of the ascending aorta. If necessary, anastomose an 8-mm graft to a peripheral artery to facilitate cardiopulmonary bypass (reported separately). Place a venous cannula directly into the right atrium. Heparinize the patient and initiate cardiopulmonary bypass with immediate systemic cooling. Because the ascending aorta is dissected to a variable and unpredictable degree, use of a standard antegrade cannula for cardioplegia solution delivery is not possible. Insert a retrograde cardioplegia cannula into the coronary sinus to administer cardioplegia and induce cardiac arrest. Continually assess the heart for distention, myocardial cooling, and sustained cardioplegic arrest. Cross-clamp the aorta just below the innominate artery. Arrest the heart with retrograde cardioplegia. Transect the dissected aorta. Identify the two coronary ostia. Direct cannulation allows for delivery of additional cardioplegia in antegrade fashion as necessary. Determine the location and complete extent of the

aortic intimal entry tear and include in the resection specimen. Following resection of the ascending aorta, size the remaining aorta for an appropriate tube graft. Assess the integrity of the aortic valve and, if necessary, resuspend the valve within the proximal ascending aorta. Reinforce the cut end of the proximal ascending aorta with a circumferential felt strip. Suture the tube graft to this reinforced proximal aorta with a running 5-0 polypropylene stitch. Measure the tube graft to length distally and suture to the distal aorta below the aortic cross-clamp using running 5-0 polypropylene stitch. In some cases, reinforce the distal suture line with felt before performing the anastomosis. In some cases the distal anastomosis may not be possible with the cross-clamp in place due to the extent of dissection and/or quality of the aortic tissue. In these situations, cool the patient to a nasopharyngeal or bladder temperature to the range of 15° to 20° C. Once the patient is cooled to the desired temperature, turn the cardiopulmonary bypass machine circuit off and interrupt circulation to the entire body. Retrograde and/or antegrade cerebral perfusion is established in some cases. Upon achieving total circulatory arrest, remove any cross-clamp, if present, allowing unobstructed view of the intimal integrity of the ascending aorta and transverse arch within a bloodless aorta. Confirm and resect the entire extent of the entry aortic tear. Cut the aorta and prepare with felt reinforcement before performing the distal anastomosis to the tube graft. Start rewarming the patient during this anastomosis. Upon completion of the distal aortic anastomosis, place the patient in the Trendelenburg position. Evacuate air from the graft as cardiopulmonary bypass is slowly re-established. Once full cardiopulmonary bypass is re-established, re-apply an aortic cross-clamp to the prosthetic graft, and re-administer antegrade or retrograde cardioplegia as needed during the rewarming period. When the patient has been rewarmed to an acceptable temperature, remove the cross-clamp, discontinue cardioplegia, and allow the heart to resume normal electrical activity. Vent the aortic root until left ventricle (LV) ejection has been present for 5 to 10 minutes. Use transesophageal echocardiogram to confirm air evaluation from the left side of heart, as well as from the tube graft, and to assess for any aortic valve insufficiency (reported separately). Accomplish continued resuscitation of the heart by allowing it to beat while unloaded on cardiopulmonary bypass. Establishing meticulous hemostasis is critical because patients are most often profoundly coagulopathic following profound hypothermia and total circulatory arrest. Place temporary pacing wires and initiate electrical pacing if necessary. Carefully wean the patient from cardiopulmonary bypass. Remove arterial, venous, and cardioplegia cannulas and secure or repair cannulation sites. Place chest tubes, and re-approximate the sternum. Close the sternal wound.

Clinical Example (33859)

A 60-year-old male is followed with serial echocardiograms looking for increasing aortic dimensions. Echocardiogram shows a 5.5-cm ascending aorta that has increased in size by 1 cm in one year. The patient is referred for surgical repair.

Description of Procedure (33859)

Perform standard median sternotomy skin incision, divide the sternum in the midline with a saw, and place arterial car-diopulmonary bypass cannula above the aneurysmal portion of the aorta. Place a venous cannula directly into the right atrium. Assess ascending aorta. Administer heparin and determine level of heparinization, establish cardiopulmonary bypass, initiate systemic cooling, and place antegrade and retrograde cardioplegia cannulas. Cross-clamp the aorta just below the innominate artery. Arrest the heart with antegrade and retrograde cardioplegia and assess heart for disten-tion, cooling, and efficacy of cardioplegic arrest. Transect the aorta where the ascending aortic dilatation begins, most commonly at the sinotubular junction. Size the cut end of the aorta for the appropriate tube graft. Suture the tube graft to the proximal aorta with a running 5-0 polypropylene stitch. Measure the tube graft to length distally and suture to the distal ascending aorta below the aortic cross-clamp using running 5-0 polypropylene stitch, thereby excluding the entire aneurysmal portion of the ascending aorta. Place the patient in the Trendelenburg position. Evacuate air from the LV and ascending tube graft. Remove the cross-clamp and vent the

aortic root until LV ejection has been present for 5 to 10 minutes. Use transesophageal echocardiography (TEE) to confirm and evaluate air in left side of heart and to assess for any aortic valve insufficiency using TEE (reported separately). Resuscitate the heart by allowing it to beat while un-loaded on cardiopulmonary bypass. Ensure hemostasis, place temporary pacing wires, and begin pacing if necessary. Discontinue cardiopulmonary bypass, remove cannulas, and repair cannulation sites. Ensure hemostasis, place chest tubes, re-approximate the sternum, and close chest wound.

Clinical Example (33871)

Upon routine chest X ray (CXR), a 60-year-old male is found to have an enlarged aortic arch with an aortic aneurysm and is referred for additional workup. Echocardiogram, computed tomography (CT), magnetic resonance imaging (MRI), and angiogram are obtained. Although the patient is asymptomatic, the findings show that the aneurysm involves the entire aortic arch. The patient is scheduled for a transverse aortic arch graft placement.

Description of Procedure (33871)

Perform standard median sternotomy skin incision, divide the sternum in the midline with a saw. Determine which ar-tery will be used for arterial access while on cardiopulmonary bypass following median sternotomy and exposure of the heart and great vessels. This may require exposure and use of the innominate artery, right subclavian artery, brachial artery, or even femoral artery. If necessary, anastomose an 8-mm graft to a peripheral artery to facilitate cardiopulmo-nary bypass (reported separately). Insert a venous cannula. Dissect free the entire transverse arch, including the innom-inate artery, left carotid artery, and left subclavian artery, and isolate with vascular tapes. Identify and protect the re-current laryngeal nerve as it crosses under the distal aortic arch. Heparinize the patient systemically and determine the level of heparinization. Establish cardiopulmonary bypass and initiate systemic cooling to establish deep hypothermia. Establish retrograde and/or antegrade cerebral perfusion with appropriate cannulae for delivery of cardioplegia when appropriate. Apply an aortic cross-clamp to the ascending aorta and transect the aorta above the cross-clamp. Anasto-mose an appropriately sized tube graft to the cut end of the ascending aorta. Once the patient is cooled to the desired temperature, turn off the cardiopulmonary bypass machine circuit and interrupt circulation to the entire body. Transect the arch vessels at the base, open and resect the transverse arch. Anastomose an appropriately sized tubular arch graft to the cut end of the proximal descending aorta. The remaining arch vessels (innominate artery, left carotid artery, and left subclavian artery) may be individually anastomosed to the arch tube graft, or the three arch vessels can be left at-tached to a remnant of the resected arch (configured as an island), which is then anastomosed to the newly constructed arch tube graft. Start a prolonged period of systemic warming as the anastomoses are being completed. This includes the final graft-to-graft (ascending aortic graft and transverse arch graft) anastomosis. As the patient approaches normo-thermia and bleeding has been sufficiently controlled, place the patient in Trendelenburg position and re-establish car-diopulmonary bypass slowly in order to evacuate air from the ascending aortic and transverse arch grafts. Vent the aor-tic root until LV ejection has been present for 5 to 10 minutes. Assess residual air (if any) in the left side of heart as well as myocardial contractility using transesophageal echocardiogram (reported separately). Resuscitate the heart by allow-ing it to beat while unloaded on cardiopulmonary bypass. Establishing meticulous hemostasis is critical because the pa-tients are most often profoundly coagulopathic following profound hypothermia and total circulatory arrest. Place tem-porary pacing wires and initiate electrical pacing if necessary. Carefully wean the patient from cardiopulmonary bypass. Remove arterial, venous, and cardioplegia cannulas and secure or repair cannulation sites. Place chest tubes and re-approximate the sternum. Close the sternal wound.

