

Cervical Fusion, Anterior

ORG: S-320 (ISC)

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Care Planning - Inpatient Admission and Alternatives

Clinical Indications for Procedure

- Procedure is indicated for **1 or more** of the following(1)(2)(3):
 - Cervical radiculopathy and **ALL** of the following:
 - Patient has significant (eg, impacts activities or sleep) symptoms due to nerve root compression (eg, pain, weakness).
 - MRI or other neuroimaging finding correlates with clinical signs and symptoms and demonstrates spinal stenosis or nerve root compression (eg, disk abnormality, facet joint hypertrophy).
 - Surgery appropriate, as indicated by **1 or more** of the following:
 - Failure of 3-month trial of nonoperative treatment that includes **1 or more** of the following:
 - NSAIDs
 - Non-narcotic analgesics (eg, tricyclic antidepressants, anticonvulsants)
 - Narcotic analgesics
 - Cervical collar
 - Physical therapy
 - Epidural or oral corticosteroids
 - Progressive (ie, worsening) neurologic deficit (eg, weakness)
 - Spondylotic myelopathy treatment, as indicated by **ALL** of the following(4)(5):
 - Signs or symptoms of myelopathy are present, as indicated by **1 or more** of the following:
 - Upper limb weakness in more than single nerve root distribution
 - Lower limb weakness in upper motor neuron distribution
 - Loss of dexterity (eg, clumsiness of hands)
 - Bowel or bladder incontinence
 - Frequent falls
 - Hyperreflexia

- Hoffmann sign[A]
- Increased extremity muscle tone or spasticity
- Gait abnormality
- Positive Babinski sign
- Alternative clinical signs or symptoms of myelopathy
- MRI or other neuroimaging finding correlates with clinical signs and symptoms and demonstrates cord compression (eg, herniated disk, osteophyte).
- Ossification of posterior longitudinal ligament with associated myelopathy(6)
- Congenital spine anomalies causing atlantoaxial instability (eg, with Down syndrome or Klippel-Feil syndrome)(2)
- Degenerative cervical spondylosis with kyphosis-causing cord compression
- Tumor of cervical spine causing pathologic fracture, cord compression, or instability(7)(8)
- Infection of cervical spine requiring decompression or debridement(7)
- ☐ Cervical pseudarthrosis and **ALL** of the following(9):
 - Symptoms (eg, pain) unresponsive to nonoperative therapy
 - Alternative etiologies of symptoms ruled out
- ☐ Degenerative spinal segment adjacent to prior decompressive or fusion procedure with **1 or more** of the following(10)(11):
 - Symptomatic myelopathy corresponding clinically to adjacent level
 - Symptomatic radiculopathy corresponding clinically to adjacent level and unresponsive to nonoperative therapy
- Posttraumatic cervical instability (eg, unstable anterior column fracture)(12)(13)
- ☐ Need for procedure as part of treating cervical spine injury (eg, trauma), as indicated by **ALL** of the following(12)(13):
 - Acutely symptomatic cervical radiculopathy or myelopathy
 - MRI or other neuroimaging finding (eg, cord compression, root compression) demonstrates pathologic anatomy corresponding to symptoms.

Alternatives to Procedure

- Alternatives include(1)(2)(3)[N](#)
 - For disk herniation with radiculopathy:
 - Nonoperative treatment that includes **1 or more** of the following:
 - NSAIDs
 - Non-narcotic analgesics (eg, tricyclic antidepressants, anticonvulsants)
 - Narcotic analgesics
 - Cervical collar
 - Physical therapy
 - Epidural or oral corticosteroids
 - For ossification of posterior longitudinal ligament(6):
 - Neck brace
 - Anti-inflammatory medication (NSAID, corticosteroid)
 - Physical therapy
 - Activity modification
 - For cervical spine injuries(12):
 - Cervical orthosis
 - Halo vest
 - Anterior decompression without fusion (eg, discectomy). See Cervical Discectomy or Microdiscectomy, Foraminotomy, Laminotomy [ISC guideline](#).(17)
 - Endonasal or transoral decompression(18)
 - Anterior corpectomy with fusion[B]
 - Cervical disk arthroplasty. See Disk Arthroplasty, Cervical [AC](#).(14)(17)(19)
 - Posterior decompression without fusion, including:
 - Foraminotomy or laminotomy. See Cervical Discectomy or Microdiscectomy, Foraminotomy, Laminotomy [ISC guideline](#).
 - Laminoplasty
 - Laminectomy procedure. See Cervical Laminectomy [ISC guideline](#).
 - Posterior fusion. See Cervical Fusion, Posterior [ISC guideline](#).
 - Radiation therapy or chemotherapy for primary tumor or metastasis(8)

Operative Status Criteria

- Ambulatory: 1-level or 2-level fusion at or below C3 in patients without myelopathy and without need for extended postoperative observation(20)(21)(22)(23)(24)(25)(26)[N](#)
- Inpatient: Multilevel (3 or more) fusion, patients requiring extended postoperative observation (eg, unstable comorbidities), or procedure on C1-C2 may require an inpatient admission.(20)(21)(22)(23)(24)(25)(26)

Preoperative Care Planning

- Preoperative care planning needs may include(1)(3)(12):
 - Preoperative evaluation, including:
 - Primary care, neurologic, or orthopedic consultation to assess baseline function and stabilize other deformities or underlying comorbidities
 - Preoperative counseling for patient with psychosocial factors, such as unrealistic expectations, clinical depression, work aversion, or use of illicit drugs
 - Preoperative counseling for smoking cessation
 - Routine preoperative evaluation. See Preoperative Education, Assessment, and Planning Tool [SR](#).(27)
 - Diagnostic test scheduling, including(6)(28):
 - Neck x-rays, including:
 - Anterior-posterior and lateral views to assess fracture or alignment
 - In absence of trauma, flexion-extension views to assess for instability
 - MRI for evaluation of soft tissues and spinal cord
 - Electrodiagnostic studies
 - Upper extremity vascular tests
 - Myelography
 - CT scan
 - Diagnostic injection[C]
 - Preoperative discharge planning as appropriate. See Discharge Planning in this guideline.

Hospitalization

Optimal Recovery Course

Day	Level of Care	Clinical Status	Activity	Routes	Interventions	Medications
1	<ul style="list-style-type: none"> • OR to floor • Social Determinants of Health Assessment • Readmission Risk Assessment • Discharge planning • Possible discharge[D] 	<ul style="list-style-type: none"> • Clinical Indications met[E] 	<ul style="list-style-type: none"> • Bed rest • Limited ambulation postoperatively 	<ul style="list-style-type: none"> • IV fluids • IV medications • Diet as tolerated postoperatively 	<ul style="list-style-type: none"> • Possible drain • Rigid cervical orthosis 	<ul style="list-style-type: none"> • Prophylactic antibiotics • Possible corticosteroids • Multimodal analgesia, possible PCA
2	<ul style="list-style-type: none"> • Social Determinants of Health Assessment • Readmission Risk Assessment • Floor to discharge • Complete discharge planning 	<ul style="list-style-type: none"> • Procedure completed • Hemodynamic stability • No evidence of infection • No evidence of vascular compromise • Respiration at baseline • Voiding ability at baseline • Neurologic status at baseline • Pain absent or managed 	<ul style="list-style-type: none"> • Ambulatory or acceptable for next level of care 	<ul style="list-style-type: none"> • Oral hydration[F] • Oral medications or regimen acceptable for next level of care • Oral diet or acceptable for next level of care 	<ul style="list-style-type: none"> • Drain absent • Rigid cervical orthosis 	<ul style="list-style-type: none"> • Corticosteroids absent or outpatient treatment arranged • PCA absent[G]

- **Discharge plans and education understood**

(1)(12)(19)(20)(21)(22)(23)(24)(25)(26) **NN**

Recovery Milestones are indicated in **bold**.

Goal Length of Stay: Ambulatory or 1 day postoperative

Note: Goal Length of Stay assumes optimal recovery, decision making, and care. Patients may be discharged to a lower level of care (either later than or sooner than the goal) when it is appropriate for their clinical status and care needs.

Extended Stay






Minimal (a few hours to 1 day), Brief (1 to 3 days), Moderate (4 to 7 days), and Prolonged (more than 7 days).

- Extended stay beyond goal length of stay may be needed for(1)(3)(12)(22)(29)(30)(31):
 - Severe deficit or injury(32)(33)
 - Patient with significant neurologic compromise, cervical injury, or multiple injuries will require longer acute care and recovery times.
 - Stay extension varies depending on injury.
 - Infectious cause(34)
 - Patient with infectious basis for cervical disease may require longer observation on parenteral antibiotics and confirmation of culture results.
 - Expect brief to moderate stay extension.
 - Extensive surgery(22)
 - Corpectomy and multilevel and extensive dissections may require brief stay extension.
 - Active comorbidities (eg, heart failure, COPD)
 - Anticipate treatment of specific comorbidity.
 - Expect brief stay extension.
 - Complications of procedure(4)(31)(35)
 - Dysphagia
 - Expect brief to moderate stay extension.
 - Postoperative hematoma requiring surgical intervention
 - Expect brief to moderate stay extension.
 - Dural tear or CSF fistula
 - Dural tear or CSF fistula may require surgical repair.
 - Expect brief to moderate stay extension.
 - Esophageal perforation
 - Esophageal perforation requires surgical repair.
 - Expect moderate to prolonged stay extension.
 - Vertebral artery injury(36)
 - Vertebral artery injury may occur with anterior approach and requires surgical repair.
 - Expect brief to moderate stay extension.
 - C5 nerve palsy
 - Expect brief to moderate stay extension.
 - Postoperative airway compromise, especially if surgery involves 3 or more levels
 - Expect brief stay extension.
 - Urinary retention
 - Expect minimal to brief stay extension.
 - Vocal cord paresis or paralysis
 - Expect brief stay extension.

See Common Complications and Conditions [↗](#) ISC for further information.




Hospital Care Planning

- Hospital evaluation and care needs may include(1)(2)(3)(12): **NN**
 - Diagnostic test scheduling and completion, including:
 - Imaging (eg, x-ray, CT scan, MRI, myelography)
 - Laboratory (eg, CBC with differential, CRP)
 - Treatment and procedure scheduling and completion, including:

- IV antibiotics
- Corticosteroids(37)(43)
- Consultation, assessment, and other services scheduling and completion, including:
 - Physical therapy[H]
 - Orthosis to stabilize neck in neutral position
- Identification of patient at high risk for readmission to prioritize transition and post-acute care:
 - ☐ Risk of readmission is increased by presence of **1 or more** of the following(44)(45)(46)(47)(48)(49)(50)(51)(52)(53)(54)(55)(56):
 - Hospitalization (nonelective) in past 6 months(57)(58)(59)(60)
 - 2 or more emergency department visits in past 6 months
 - No source of outpatient care other than emergency department (eg, no primary care provider)(59)(61)
 - Severe care transition barriers (eg, no caregiver, homeless)(57)(58)(62)
 - Severe or end-stage renal disease (on dialysis or GFR less than 30 mL/min/1.73m² (0.5 mL/sec/1.73m²))(57)(63)(64)  eGFR - Adult Calculator  eGFR - Pediatric Calculator
 - Acute kidney injury acquired during hospitalization (eg, 2-fold or more rise in serum creatinine from baseline, or reduction of more than 50% in estimated glomerular filtration rate from baseline)(65)(66)(67)  eGFR - Adult Calculator  eGFR - Pediatric Calculator
 - Metastatic solid tumor (eg, lung cancer, breast cancer)(56)
 - Advanced liver disease (eg, cirrhosis with portal hypertension, history of variceal bleed)
 - History of stroke(39)
 - Presence of diabetes treated with insulin(38)
 - ASA score of III or greater(40)(41)(42)
 - History of chronic obstructive pulmonary disease (COPD)(42)
- Monitoring patient's status for deterioration and comorbid conditions (see Inpatient Monitoring and Assessment Tool  SR); key items include:
 - Neurologic function
 - Swelling in neck
 - Esophageal perforation
 - Upper airway obstruction
 - Hoarseness or other speech dysfunction (vocal cord paresis)
 - Dysphagia(37)(68)
 - New-onset headache
 - Urinary retention
 - Wound healing or hematoma formation at neck and donor site (ie, hip); issues include:
 - Drain output amount and type
 - Pain, tenderness, redness, or swelling at incision site
 - Worsening of comorbid medical disorders (eg, COPD)

Discharge

Discharge Planning

- Discharge planning includes[]:
 - Assessment of needs and planning for care, including(70):
 - Develop treatment plan (involving multiple providers as needed).
 - Evaluate and address preadmission functioning as needed.
 - Evaluate and address psychosocial status issues as indicated. See Psychosocial Assessment  SR for further information.
 - Evaluate and address social determinants of health (eg, housing, food). See Social Determinants of Health Screening Tool  SR for further information.(69)
 - Evaluate and address patient or caregiver preferences as indicated.
 - Identify skilled services needed at next level of care, with specific attention to:
 - Cast or immobilizer care(12)
 - Neurologic status assessment(71)
 - Pain management
 - Rehabilitation therapy or equipment coordination
 - Wound or dressing management(72)
 - Early identification of anticipated discharge destination; options include(73)(74):
 - Home, considerations include:
 - Access to follow-up care
 - Home safety assessment. See Home Safety Assessment  SR for further information.

- Self-management ability if appropriate. See Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL) Assessment [SR](#) for further information.
- Caregiver need, ability, and availability
- Post-acute skilled care or custodial care as indicated. See Discharge Planning Tool [SR](#) for further information.
- Transitions of care plan complete, including(74):
 - Patient and caregiver education complete. See Cervical Fusion, Anterior: Patient Education for Clinicians [SR](#) for further information.
 - See Teach Back Tool [SR](#) for further information.
- ☐ Medication reconciliation completion includes(75)(76):
 - Compare patient's discharge list of medications (prescribed and over-the-counter) against provider's admission or transfer orders.
 - Assess each medication for correlation to disease state or medical condition.
 - Report medication discrepancies to prescribing provider, attending physician, and primary care provider, and ensure accurate medication order is identified.
 - Provide reconciled medication list to all treating providers.
 - Confirm that patient or caregiver can acquire medication.
 - Educate patient and caregiver.
 - Provide complete medication list to patient and caregiver.
 - Importance of presenting personal medication list to all providers at each care transition, including all provider appointments
 - Reason, dosage, and timing of medication (eg, use "teach-back" techniques)(77)
 - Encourage communication between patient, caregiver, and pharmacy for obtaining prescriptions, setting up home medication delivery, and reviewing for drug-drug interactions.
 - See Medication Reconciliation Tool [SR](#) for further information.
- Plan communicated to patient, caregiver, and all members of care team, including(78)(79):
 - Inpatient care and service providers
 - Primary care provider
 - All post-discharge care and service providers
- Appointments planned or scheduled, which may include:
 - Primary care provider
 - Neurologist
 - Neurosurgeon
 - Orthopedic surgeon
 - Rehabilitation therapy services
 - Specialists for management of comorbidities as needed(56)(80)
 - Other
- Outpatient testing and procedure plans made, which may include:
 - Bone densitometry(81)
 - Other
- Referrals made for assistance or support, which may include:
 - Financial, for follow-up care, medication, and transportation
 - Tobacco use treatment(82)
 - Vocational rehabilitation(71)
 - Other
- Medical equipment and supplies coordinated (ie, delivered or delivery confirmed), which may include:
 - Rigid cervical orthosis(71)(83)
 - Wound care equipment and supplies(84)
 - Other

Discharge Destination

- Post-hospital levels of admission may include:
 - Home.
 - Home healthcare. See Home Care Indications for Admission Section [HC](#) in Cervical Spine Surgery guideline in Home Care.
 - Recovery facility care. See Recovery Facility Care Indications for Admission Section [RFC](#) in Cervical Spine Surgery guideline in Recovery Facility Care.

Evidence Summary

Criteria

The evidence for the clinical indications found in this guideline includes 8 published peer reviewed articles, 1 specialty society or other evidence-based guideline, and 4 book sections.

Alternatives

A systematic review and meta-analysis of randomized controlled trials comparing anterior cervical discectomy and fusion to total disk replacement (14 randomized controlled trials, 3160 patients) in patients with cervical disk disease found that total disk replacement was as effective as anterior cervical discectomy and fusion, and may be superior in some outcomes, such as development of adjacent segment disease.(14) **(EG 1)** A randomized controlled trial of 163 patients (mean age 62 years) with multilevel cervical spondylotic myelopathy compared a ventral (anterior cervical disk removal with instrumented fusion) vs a dorsal (laminectomy with instrumented fusion or open-door laminoplasty) approach and found, at 1-year follow-up, no statistically significant differences in patient-reported outcomes (eg, short-form 36 physical component summary score).(15) **(EG 1)** A systematic review and meta-analysis including 21 randomized controlled trials (1567 patients) that compared various surgical interventions for patients with cervical radiculopathy found that most of the studies were small, and even in meta-analysis were unable to detect differences in clinical outcomes.(16) **(EG 1)** One comparison, based on 3 randomized controlled trials (177 patients), found that anterior cervical discectomy without an intervertebral spacer had a lower likelihood of clinical success than anterior cervical discectomy with fusion (0.87 risk ratio (RR); 95% confidence interval (CI) 0.77 to 0.98).(16) **(EG 1)** In the same analysis, based on 3 randomized trials (176 patients), anterior cervical discectomy with fusion with autologous bone graft was more likely to result in complications than anterior cervical discectomy with fusion with cage (3.40 RR; 95% CI 1.56 to 7.43), mostly due to donor site morbidity.(16) **(EG 1)**

Operative Status

Patients undergoing 1-level or 2-level fusion at or below C3, presenting without myelopathy, and without need for extended observation (eg, without unstable comorbidities), may be treated on an outpatient basis.(20)(21)(22)(23)(24)(25)(26) **(EG 2)** Patients undergoing more than a 2-level fusion, requiring extended postoperative monitoring (eg, for unstable medical comorbidities, myelopathy), or having a procedure on levels C1 or C2, or requiring urgent nonelective surgery may require an inpatient admission.(20)(21)(22)(23)(24)(25)(26) **(EG 3)**

Hospitalization

A double-blind randomized placebo controlled trial comparing receipt of topical steroid vs no topical steroid in the retro-esophageal space prior to surgical closure (109 patients) found that the topical application of steroid resulted in significantly decreased severity of postoperative dysphagia both immediately after the procedure and 1 month postoperatively.(37) **(EG 1)**

Readmission risk and reduction: Database analysis of 3725 adults who underwent anterior cervical discectomy and fusion surgery found, after multivariate analysis, that the presence of insulin-dependent diabetes mellitus was independently associated with increased risk of 30-day readmission.(38) **(EG 2)** Multivariate analysis of 1701 patients who underwent anterior cervical discectomy and fusion surgery found that history of prior stroke was independently associated with readmission at 30 days.(39) **(EG 2)** Database analysis of 17,088 adult patients who underwent anterior cervical discectomy and fusion found that American Society of Anesthesiologists class IV and age older than 70 years were independently associated with an increased risk of 30-day readmission.(40) **(EG 2)** Review of a national database of patients undergoing anterior cervical surgery with fusion (15,600 patients) found, after multivariate adjustment, that American Society of Anesthesiologists class III or higher was independently associated with increased risk of 30-day readmission.(41) **(EG 2)** Review of a national database of patients undergoing anterior cervical decompression and fusion (ACDF) of 1 or 2 levels (18,833 patients) found after multivariate analysis that American Society of Anesthesiologists class III or greater and a history of COPD were independently associated with increased risk of readmission.(42) **(EG 2)**

Length of Stay

Database analysis of 4730 patients older than 65 years (mean age 70 years) who underwent anterior discectomy and fusion reported a median length of stay of 1 day.(20) **(EG 2)** Database analysis of 19,164 patients (29% age 60 years or older) who underwent anterior discectomy and fusion (41% 2 or more level fusion) surgery found a mean length of stay of 1.5 days.(21) **(EG 2)** A review of a national database for surgical quality found that of a cohort of 15,241 patients who had an anterior cervical discectomy and fusion, 79% had a length of stay of 1 day or less.(22) **(EG 2)** Review of a cohort of patients undergoing elective anterior cervical discectomy with fusion (590 patients, mean age 54 years) found a median length of stay of 1 day.(24) **(EG 2)** Analysis of a cohort of patients undergoing anterior cervical discectomy and fusion (2159 patients) found that 70% had a length of stay that was less than 2 midnights.(25) **(EG 2)** Retrospective review of a national quality improvement database of patients undergoing anterior cervical discectomy and fusion (19,283 patients, mean age 54 patients) found that 75% of patients had a length of stay of 1 day or less.(26) **(EG 2)**

Patients discharged the day after surgery can be considered inpatients or outpatients, depending on regulation or contractual arrangements. Whether considered inpatients or outpatients, analysis of data for a commercially insured population shows 85% of patients undergoing a principal procedure of anterior cervical fusion were discharged the day of or the day after surgery.(23) **(EG 3)** A similar analysis for Medicare-insured patients shows 69% of patients were discharged the day of or the day after surgery.(23) **(EG 3)**

Rationale

Surgical MCG care guidelines help the clinician to identify, for a given procedure, which patient-specific factors and clinical conditions are appropriate for that procedure. The evidence-based clinical indication criteria assist the clinician in the decision to appropriately perform a procedure, evaluating whether the potential benefits of a procedure outweigh the potential risks. For Medicare enrollees, surgical MCG care guidelines also identify which procedures CMS has designated as inpatient only.

Related CMS Coverage Guidance

This guideline supplements but does not replace, modify, or supersede existing Medicare regulations or applicable National Coverage Determinations (NCDs) or Local Coverage Determinations (LCDs).

Code of Federal Regulations (CFR): 42 CFR 412.3(85); 42 CFR 419.22(n)(86); 42 CFR 422.101(87)

Internet-Only Manual (IOM) Citations: CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 1 - Inpatient Hospital Services Covered Under Part A(88); CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 6 - Hospital Services Covered Under Part B(89); CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 15 - Covered Medical and Other Health Services(90); CMS IOM Publication 100-08, Medicare Program Integrity Manual, Chapter 6, Section 6.5 - Medical Review of Inpatient Hospital Claims for Part A Payment(91)

Medicare Coverage Determinations: Medicare Coverage Database(92)

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Footnotes

[A] Hoffmann sign is involuntary flexion of the thumb or index finger when the examiner flexes the terminal phalanx of the third (long) finger.(5) [A in Context Link 1]

[B] Corpectomy refers to the removal of all or a substantial portion of the vertebral body and includes removal of the disks above and below the vertebral body.(1)(2) [B in Context Link 1]

[C] Epidural or facet joint injections of anesthetics or corticosteroids may be used to assist in localizing the source of pain.(1) [C in Context Link 1]

[D] See Ambulatory Surgery Discharge and Complications: Common Complications and Conditions  ISC for further information. [D in Context Link 1]

[E] See Clinical Indications for Procedure in this guideline. [E in Context Link 1]

[F] Some patients may have their hydration needs met via alternative means (eg, percutaneous endoscopic gastrostomy tube). [F in Context Link 1]

[G] Use Multimodal analgesia or individual analgesic agent as indicated. [G in Context Link 1]

[H] Physical therapist instruction may be part of discharge planning. [H in Context Link 1]

[I] Discharge instructions should be given in the patient's and caregiver's native language using trained language interpreters whenever possible.(69) [I in Context Link 1]

Definitions

Hemodynamic stability

- Hemodynamic stability, as indicated by **1 or more** of the following:
 - Hemodynamic abnormalities at baseline or acceptable for next level of care
 - Patient hemodynamically stable, as indicated by **ALL** of the following(1)(2)(3)(4)(5):
 - Tachycardia absent
 - Hypotension absent
 - No evidence of inadequate perfusion (eg, no myocardial ischemia)
 - No other hemodynamic abnormalities (eg, no Orthostatic hypotension)

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Hypotension absent

- Hypotension absent, as indicated by **1 or more** of the following(1)(2)(3)(4):
 - SBP greater than or equal to 90 mm Hg in adult or child 10 years or older
 - Mean arterial pressure^[A] greater than or equal to 70 mm Hg in adult or child 10 years or older
 - Mean arterial pressure^[A] at patient's baseline (eg, healthy adult with low SBP), at intentional therapeutic goal (eg, patient with heart failure), or acceptable for next level of care (eg, blood pressure stable and no significant signs or symptoms due to low blood pressure)
 - SBP greater than or equal to sum of 70 mm Hg plus twice patient's age in years in child 1 to 9 years of age
 - SBP greater than or equal to 70 mm Hg in infant 1 to 11 months of age

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Footnotes

A. The mean arterial pressure takes into account both systolic and diastolic blood pressure readings and is calculated as Mean Arterial Pressure (MAP) = 1/3 SBP + 2/3 DBP.

Multimodal analgesia

- Multimodal analgesia involves the utilization of 2 or more analgesic agents with different mechanisms of action in order to provide additive or synergistic pain control, while minimizing side effects and reliance on opioids.(1)(2)(3)

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Orthostatic hypotension

- Orthostatic hypotension,^{[A][B]} as indicated by **1 or more** of the following(1)(2)(3):
 - Fall in SBP of 20 mm Hg or more 1 to 3 minutes after patient sits or stands from recumbent position
 - Fall in DBP of 10 mm Hg or more 1 to 3 minutes after patient sits or stands from recumbent position





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Footnotes

- A. Concomitant measurements of the heart rate are important to measure to help diagnose subtypes of orthostatic hypotension (eg, the lack of a compensatory increase in heart rate is typical of autonomic failure and an exaggerated tachycardia may be reflective of volume depletion). However, the heart rate is not a component of the definition of orthostatic hypotension which relies upon blood pressure alone.(1)(2)(3)
- B. Criteria based upon clinician acquired numeric values (eg, vital signs, oxygen saturation) should be used if they are accurate reflections of the patient's condition. Transitory findings (eg, abnormal only upon initial emergency department intake or only one time out of multiple readings) that rapidly improve with no or minimal treatment usually do not reflect disease severity or risk for deterioration. This does not imply that an initial or one-time reading cannot ever be applicable. The goal is to separate erroneous or incidental findings from those that truly represent the patient's clinical picture.

Readmission Risk Assessment

- Risk of readmission is increased by presence of **1 or more** of the following(1)(2)(3)(4)(5)(6)(7)(8)(9)(10)(11)(12)(13):
 - Hospitalization (nonelective) in past 6 months(14)(15)(16)(17)
 - 2 or more emergency department visits in past 6 months
 - No source of outpatient care other than emergency department (eg, no primary care provider)(16)(18)
 - Severe care transition barriers (eg, no caregiver, homeless)(14)(15)(19)
 - Severe or end-stage renal disease (on dialysis or GFR less than 30 mL/min/1.73m² (0.5 mL/sec/1.73m²))(14)(20)(21)
 -  eGFR - Adult Calculator  eGFR - Pediatric Calculator
 - Acute kidney injury acquired during hospitalization (eg, 2-fold or more rise in serum creatinine from baseline, or reduction of more than 50% in estimated glomerular filtration rate from baseline)(22)(23)(24)  eGFR - Adult Calculator  eGFR - Pediatric Calculator
 - Metastatic solid tumor (eg, lung cancer, breast cancer)(13)
 - Advanced liver disease (eg, cirrhosis with portal hypertension, history of variceal bleed)
 - History of stroke(25)
 - Presence of diabetes treated with insulin(26)
 - ASA score of III or greater(27)(28)(29)
 - History of chronic obstructive pulmonary disease (COPD)(28)

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Social Determinants of Health Assessment

- Risk of poor health outcomes may be increased by the presence of **1 or more** of the following social determinants of health(1)(2)(3)(4):
 - Housing insecurity, as indicated by **1 or more** of the following:
 - Individual or caregiver's current living situation is **1 or more** of the following(5):
 - Does not have own housing (eg, staying in a hotel, shelter, or with others)
 - Has own housing (eg, house, apartment), but at risk of losing it in the future (ie, behind on rent or mortgage)
 - Has own housing (eg, house, apartment), but has lived in 3 or more places in past year
 - Current housing has **1 or more** of the following:
 - Electrical appliances (eg, stove, refrigerator) not working or unavailable
 - Insufficient heating or cooling
 - Insufficient ventilation
 - Lead paint or pipes
 - Mold
 - Pests (eg, bugs) or rodents
 - Smoke detectors not working or unavailable
 - Food insecurity, as indicated by **1 or more** of the following(6):
 - In the past year, individual or caregiver ran out of food and did not have money to buy more food.
 - In the past year, individual or caregiver worried that they would run out of food before they received money to buy more food.
 - Insufficient transportation, as indicated by **1 or more** of the following(7):
 - In the past year, individual or caregiver missed medical appointments or could not get medications due to lack of transportation.
 - In the past year, individual or caregiver missed nonmedical activities, work, or could not get things needed for daily living due to lack of transportation.
 - Insufficient utilities, as indicated by **1 or more** of the following(8):
 - Utilities (eg, electricity, water, gas, or oil) are currently shut off or unavailable.
 - In the past year, electric, water, gas, or oil company threatened to shut off services.
 - Personal safety risk, as indicated by **2 or more** of the following(6):
 - Individual is sometimes or frequently physically hurt by another person (including family member).
 - Individual is sometimes or frequently insulted or talked down to by another person (including family member).
 - Individual is sometimes or frequently threatened with physical harm by another person (including family member).
 - Individual is sometimes or frequently screamed or cursed at by another person (including family member).
 - Insufficient dependent care, as indicated by **1 or more** of the following:
 - In the past year, individual or caregiver was unable to work due to lack of dependent care.
 - In the past year, individual or caregiver was unable to work more (additional) hours due to lack of dependent care.
 - In the past year, individual or caregiver missed medical appointments or could not get medications due to lack of dependent care.
 - In the past year, individual or caregiver missed nonmedical activities (eg, school, church, social activity) due to lack of dependent care.
 - Depression risk, as indicated by **ALL** of the following:
 - In the past 2 weeks, individual had little interest or pleasure in normal activities on at least several days.
 - In the past 2 weeks, individual felt down, depressed, or hopeless on at least several days.

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Tachycardia absent

- Tachycardia absent, as indicated by **1 or more** of the following(1)(2):
 - Heart rate less than or equal to 100 beats per minute in adult or child 6 years or older
 - Heart rate less than or equal to 115 beats per minute in child 3 to 5 years of age
 - Heart rate less than or equal to 125 beats per minute in child 1 or 2 years of age
 - Heart rate less than or equal to 130 beats per minute in infant 6 to 11 months of age
 - Heart rate less than or equal to 150 beats per minute in infant 3 to 5 months of age
 - Heart rate less than or equal to 160 beats per minute in infant 1 or 2 months of age

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Codes

ICD-10 Diagnosis: M43.01, M43.02, M43.03, M43.11, M43.12, M43.13, M46.21, M46.22, M46.23, M46.31, M46.32, M46.33, M46.41, M46.42, M46.43, M46.51, M46.52, M46.53, M47.011, M47.012, M47.013, M47.021, M47.022, M47.11, M47.12, M47.13, M47.21, M47.22, M47.23, M47.811, M47.812, M47.813, M47.891, M47.892, M47.893, M48.01, M48.02, M48.03, M48.51XA, M48.51XS, M48.52XA, M48.52XS, M48.53XA, M48.53XS, M50.00, M50.01, M50.020, M50.021, M50.022, M50.023, M50.03, M50.10, M50.11, M50.120, M50.121, M50.122, M50.123, M50.13, M50.20, M50.21, M50.220, M50.221, M50.222, M50.223, M50.23, M50.30, M50.31, M50.320, M50.321, M50.322, M50.323, M50.33, M50.80, M50.81, M50.820, M50.821, M50.822, M50.823, M50.83, M50.90, M50.91, M50.920, M50.921, M50.922, M50.923, M50.93, M54.11, M54.12, M54.13, M80.08XA, M80.88XA, M84.58XA, M96.1, M99.10, M99.11, M99.20, M99.21, M99.30, M99.31, M99.40, M99.41, M99.50, M99.51, M99.60, M99.61, M99.70, M99.71, Q76.2, S13.0XXA, S13.100A, S13.101A, S13.110A, S13.111A, S13.120A, S13.121A, S13.130A, S13.131A, S13.140A, S13.141A, S13.150A, S13.151A, S13.160A, S13.161A, S13.170A, S13.171A, S13.180A, S13.181A, S13.20XA, S13.29XA, S14.101A, S14.102A, S14.103A, S14.104A, S14.105A, S14.106A, S14.107A, S14.108A, S14.109A, S14.131A, S14.132A, S14.133A, S14.134A, S14.135A, S14.136A, S14.137A, S14.138A, S14.139A, S14.151A, S14.152A, S14.153A, S14.154A, S14.155A, S14.156A, S14.157A, S14.158A, S14.159A [Hide]

ICD-10 Procedure: 0RG0070, 0RG00A0, 0RG00J0, 0RG00K0, 0RG0370, 0RG03A0, 0RG03J0, 0RG03K0, 0RG0470, 0RG04A0, 0RG04J0, 0RG04K0, 0RG1070, 0RG10A0, 0RG10J0, 0RG10K0, 0RG1370, 0RG13A0, 0RG13J0, 0RG13K0, 0RG1470, 0RG14A0, 0RG14J0, 0RG14K0, 0RG2070, 0RG20A0, 0RG20J0, 0RG20K0, 0RG2370, 0RG23A0, 0RG23J0, 0RG23K0, 0RG2470, 0RG24A0, 0RG24J0, 0RG24K0, 0RG4070, 0RG40A0, 0RG40J0, 0RG40K0, 0RG4370, 0RG43A0, 0RG43J0, 0RG43K0, 0RG4470, 0RG44A0, 0RG44J0, 0RG44K0 [Hide]

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Last Update: 9/21/2023 11:22:40 AM
Build Number: 27.2.2023092114759.013030