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Brief Summary

GUIDELINE TITLE

Pressure ulcer treatment. Health care protocol.

BIBLIOGRAPHIC SOURCE(S)

Institute for Clinical Systems Improvement (ICSI). Pressure ulcer treatment. Health care protocol. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2008 Jan. 28 p. [36 references]

GUIDELINE STATUS

This is the current release of the guideline.

BRIEF SUMMARY CONTENT

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Note from the National Guideline Clearinghouse (NGC) and the Institute for Clinical Systems Improvement (ICSI): For a description of what has changed since the previous version of this protocol, refer to Summary of Changes Report– January 2008.

The recommendations for treatment of pressure ulcers are presented in the form of a protocol accompanied by 7 detailed annotations. Clinical highlights and the annotations follow.

Class of evidence (A-D, M, R, X) definitions are provided at the end of the "Major Recommendations" field.

Clinical Highlights

- The treatment of pressure ulcers should include an assessment specific to the wound, including the following elements: history and physical, etiology, psychosocial needs, nutritional status, wound assessment and documentation of these elements. *(Annotation #1)*
- The treatment of pressure ulcers should be consistent and evidence based. *(Annotation #2)*
- Education should be provided to the patient, family, caregivers and health care team members regarding treatment of pressure ulcers. *(Annotation #6)*

Special Considerations

Persons undergoing palliative or hospice care may need an alteration in their goals of care. The goals of care can shift from prevention and treatment to palliation and management of ulcer pain and odor *[R]*.

Annotations for Pressure Ulcer Treatment

1. **Wound Assessment**

Key Points:

- The assessment for pressure ulcer treatment should focus on the wound and following elements: history and physical, etiology, psychosocial needs, and nutritional status.

History and Physical

Review of a current health history and physical assessment will help identify contributory factors that need attention when developing a wound treatment plan. For example, patients with atherosclerotic cardiovascular disease or low blood pressure may not perfuse tissue at normal levels and therefore would be at higher risk of developing pressure ulcers. Also, patients who use tobacco or have low hemoglobin would have reduced oxygen transported to cells, thus increasing the risk of cell death. Diabetes can cause microvascular disease and loss of protective sensation of the lower extremities, both contributing factors in the development of pressure ulcers. Neurological injuries from stroke and spinal cord injury or deficits in mobility or level of consciousness could interfere with the patient's ability to reposition or sense/indicate discomfort. The subscales of validated risk assessment tools guide practitioners to the areas of risk and need for intervention *[C]*.

Medical management of comorbidities is crucial to wound healing. Please see the National Guideline Clearinghouse (NGC) summary of the Institute for Clinical Systems Improvement (ICSI) Skin Safety Protocol and Risk Assessment and Prevention of Pressure Ulcers for at-risk patients.

Etiology of Wound

The identification of the source of pressure should take place as a preventive measure or as soon as injury is suspected. If the patient's overall health status should support healing but no improvement in the wound has been noted, the source of pressure may not have been correctly identified, and therefore the interventions may not be effective.

Psychosocial Needs

Psychosocial issues may affect pressure ulcer development and treatment. One study reported that increased isolation from friends and family, financial problems, pain, lack of privacy, changes in body image and loss of control and independence have significant impact on the patient and their recovery. Lower levels of well-being and activity in spinal cord injury and pressure ulcer development have been reported *[D]*. There is some evidence to support that psychological factors may influence the development of pressure ulcers, and an individual's style of coping may have an effect on outcomes *[D]*.

Providing holistic care through empathy, knowledge, and tailoring the plan of care to the individual needs will facilitate physical healing as well as the spiritual healing *[D]*. Interventions to enhance socialization such as encouraging involvement in current relationships, in developing relationships, and positive feedback when patient reaches out to others might be beneficial *[R]*. Interventions to enhance body image would include assisting patients to discuss changes caused by the pressure ulcer and assisting patient to separate physical appearance from feelings of personal worth *[R]*. Pain management, financial assistance and providing privacy may also help to enhance the patient's psychosocial adjustment to the pressure ulcer.

Nutritional Status

Nutritional needs are based on the patient's age, sex, height, weight, presence of wasting or obesity, current disease state, severity of illness, and presence and severity of wounds. The work group recommends collecting a baseline.

Adequate nutrition and hydration are critical to wound healing. A thorough assessment of nutritional status is an important component of the initial evaluation of the patient who has a pressure ulcer. Follow-up nutritional assessments indicate changes in nutritional status and response to interventions *[R]*.

Nutrition:

- Albumin: 3.5 to 5.5 g/dL, long half-life (18 to 20 days), affected by hydration status.
- Pre-albumin: 15 to 25 mg/dL, shorter half-life (two days), reflects what has been absorbed and metabolized recently. *[R]*

Assessment

Pressure ulcer assessment consists of an assessment of the wound and surrounding skin (periwound). Clean the wound and surrounding skin prior to assessment. Assessment of the wound should occur when the wound is initially identified, when dressings are changed, and prior to any transition from one health care setting to another. This transition assessment is essential to communicate clearly to the next level of care regarding the state of the wound.

The following **assessment** factors should be considered:

- (**A**) Anatomic location
- (**S**) Size, shape
- (**S**) Stage
- (**E**) Exudate
- (**S**) Surrounding skin
- (**S**) Sinus tract, tunneling
- (**M**) Margins
- (**E**) Edges
- (**N**) Nose (odor)
- (**T**) Tissue

[C], [R]

Refer to the Table on page 11 of the original guideline document for additional information on wound assessment.

Documentation

Wound assessment should be documented on admission or initially identified, with each dressing change and prior to any transition from one health care setting to another. Dressing status should be documented every shift. If advanced wound dressings are in place on day of discharge, the previous dressing change assessment should be noted.

A paper checklist or process within an electronic medical record system could be a tool to support documentation.

2. **Pressure Ulcer Treatment**

Key Points:

- The treatment goal may be either healing, palliative or maintenance. Pressure ulcer treatment should include wound cleansing and product selection. Treatment may include surgical repair, adjunctive therapy, or debridement.

Comorbidities and Chronic Conditions

The effectiveness and success of treatment of pressure ulcers is greatly influenced by pre-existing comorbidities and chronic conditions. When developing a plan of care for pressure ulcer treatment, the health care provider must first determine whether the pressure ulcer care is healing, palliative or maintenance. Considerations of the following comorbidities and chronic conditions is necessary but not limited to:

- Peripheral vascular disease
- Myocardial infarction
- Congestive heart failure
- Chronic obstructive pulmonary disease
- Cancer
- Stroke

- Musculoskeletal disorders or fractures
- Gastrointestinal bleed
- Liver failure
- Dementia
- Renal disease
- Diabetes
- Malnutrition
- Smoking
- Drug therapies
- Radiation therapy
- Neurological disorders
- History of pressure ulcer
- Preterm neonates

Knowledge of comorbidities and chronic conditions and how they impact the healing process by reducing the amount of oxygen, amino acids, vitamins and minerals available at the wound site thereby determines the appropriate interventions for optimum pressure ulcer healing.

Treatment Goal

Determine the goal for treatment: healing, palliative, or maintenance. Items to consider for treatment goals include: if there is edema, the edema must be managed for the wound to heal; and if the vascular supply is compromised, that needs to be addressed. Also consider the following: volume of drainage, location, stage, size, undermining, tunneling, periwound skin, bacterial burden, odor, pain, history of wound, comorbidities, patient and caregiver needs and reimbursement issues.

The treatment goal directs the plan of care:

- Debride the wound and prepare for surgical intervention
- Complete wound closure
- Managing pain, drainage, and odor in a patient on palliative care

Palliative Care

Many of the interventions of a treatment plan to heal a wound are not possible with a patient who is on palliative care. The focus should be to manage pain, drainage and odor.

Advanced wound care may be used in these situations and may include:

- Charcoal over the wound bed
- Topical antimicrobial dressings (i.e., silver, cadexomer iodine)
- Topical metronidazole
- Topical anesthesia
- Two-hour turning schedule may not be possible due to pain

Wound Cleansing

Wound healing is optimized and risk of infection is reduced when all necrotic tissue, exudates, metabolic wastes, and residue of wound care products are removed from the wound. Routine wound cleansing is used for both necrotic and clean wounds. Routine wound cleansing should be accomplished with minimal chemical or mechanical trauma to the tissue *[M]*. Traumatized wounds have a greater risk of infection and slower healing. The process of cleansing a wound involves selection of both a wound cleansing solution and a mechanical means of delivering that solution to the wound.

Goals of Cleansing

- Remove non-viable tissue, bacteria, bacterial toxins from the wound surface
- Protect healing wound
- Facilitate wound assessment by optimizing visualization of wound

General Points of Cleansing

- Cleanse the wound initially and at each dressing change
- Use universal precautions to minimize risk of cross-contamination
- Minimize mechanical force when cleansing ulcer with gauze, cloth, or sponges

Mechanical Cleansing Procedure

Work in a circular pattern, starting at the center of the wound to gently cleanse the wound with the moistened gauze. Work toward the edge of the wound and surrounding skin. Remove loose tissue with the gauze pad. Do not press hard or scrub because this will damage the tissue and slow healing. Do not return to the wound center after cleansing, to avoid recontamination of the wound.

Antiseptics and Cleansers

Normal saline is a safe and effective cleanser for all wounds. Normal saline is physiologic and will not harm tissue. It will adequately cleanse most wounds if a sufficient amount is used to thoroughly flush the wound.

Drinkable tap water is as effective as saline to cleanse a wound. Cleansing can be done under running water in a sink or preferably in the shower. Immunosuppressed patients should not use tap water *[M]*, *[R]*.

Do not use agents such as povidone-iodine, sodium hypochlorite solution, hydrogen peroxide, or acetic acid that are cytotoxic to granulating wound tissue. Limit the use of antiseptic agents on wounds with evidence of a heavy bioburden; use agents and dilutions that minimize any adverse effects; and discontinue antiseptics as soon as the bacterial balance has been restored, as evidenced by a clean wound bed and a

reduced volume of exudate. If the wound has heavy exudates or adherent material, a commercial wound cleanser may be used. Commercial wound cleansers contain surfactants that help remove wound contaminants *[R]*.

Irrigation

High-pressure irrigation may be needed in the presence of slough and necrotic tissue *[R]*.

- The cleansing method should provide enough pressure to remove debris yet not cause trauma to the wound bed. The optimal pressure to cleanse is between 4 and 15 psi.
- A 35 mL syringe with 19-gauge angiocath creates an 8-psi irrigation pressure stream, which may be used to remove adherent material in the wound bed *[R]*.

Periwound Skin Cleansing

Periwound skin must be protected throughout the healing process. Trauma, excoriation, erythema, maceration, and dermatitis of intact skin delay epithelial activity and increase pain. Special attention to the periwound skin should be part of all dressing changes. Barrier films, absorptive dressings, and hydrocolloids can be used to protect the periwound. Cleaning the periwound skin with a pH balanced skin cleanser rather than saline promotes the healing of pressure ulcers *[D]*. Intact skin should be moisturized regularly to prevent cracking of the skin.

Moist Wound Healing

A moist wound surface promotes cell migration and prevents cell death. The clinician must select agents that maintain or donate moisture at the wound surface. The cardinal rule of healing is to keep the wound tissue moist and the surrounding skin intact and dry. Use a dressing that will keep the wound bed continuously moist. Wet-to-dry dressings are not considered a continuously moist saline dressings and are not recommended *[B]*, *[C/NA]*, *[R]*.

Products

- Alginates or other fiber gelling dressings
- Composites
- Contact layers
- Foam
- Gauze
- Impregnated gauze
- Hydrocolloid
- Hydrogel
- Specialty absorptive dressings
- Transparent film
- Wound fillers
- Wound pouches
- Antimicrobials
- Collagen
- Enzyme debriding agents

Refer to the original guideline document for more information on these products.

The work group recommends the following tips:

- If it is dirty, clean it.
- If it is slough, don't fluff.
- If it is deep, fill it.
- If it is open, cover it.
- If it is dry, moisten it.
- If it is wet, absorb it.

Negative Pressure Wound Therapy

Negative pressure wound therapy is a relatively new treatment in which controlled negative pressure is used in an attempt to provide evacuation of wound fluid, stimulate granulation tissue, decrease bacterial colonization, and enhance the body's natural capability to heal. Pressure, vascular and neuropathic ulcers; surgical wounds; split thickness meshed skin grafts; and flaps have been suggested as indications for use. A patient must have an overall physiological capacity to heal in order to be an appropriate candidate.

As yet, there have been few randomized controlled trials regarding the net benefit of negative pressure wound therapy compared to more conventional wound treatments and dressings, and no trials have included greater than about 70 total patients. Results have been conflicting in terms of finding significant differences in efficacy of negative pressure wound therapy compared to other treatments. Therefore, no definitive conclusions regarding the comparative net benefit of negative pressure wound therapy can be drawn. However, this may be due to the small sample sizes of the studies, and no study has shown negative pressure wound therapy to be inferior to any conventional treatment, and negative pressure wound therapy may increase patient comfort and decrease nursing staff time due to the need for fewer dressing changes (about every 48 hours) as compared to conventional dressings, which may need multiple daily changes. Therefore, negative pressure wound therapy may be considered in patients with severe (stage III or IV), non-healing pressure ulcers where optimal conventional treatments have failed to enhance the healing process. Large multicenter, randomized control trials are in progress that may provide more definitive evidence regarding the net efficacy of negative pressure wound therapy on pressure ulcers.

Contraindications for treatment include necrotic tissue with eschar, untreated osteomyelitis, or malignancy in the wound. Precautions to consider include active bleeding, anticoagulation use and difficult wound hemostasis *[R]*.

Adjunct Therapy

Several adjunctive therapies to enhance pressure ulcer healing have been investigated. The therapies considered by the Agency for Health

Care Research and Quality panel included electrical stimulation, hyperbaric oxygen, infrared ultraviolet and low-energy laser irradiation, ultrasound, miscellaneous topical agents (including cytokine growth factors), and systemic drugs other than antibiotics. At this time, electrical stimulation is the only adjunctive therapy with sufficient supporting evidence to warrant recommendation. Consider a course of treatment with electrical stimulation for stage III and IV pressure ulcers that have proved unresponsive to conventional therapy. Electrical stimulation may also be useful for recalcitrant stage II ulcers *[R]*.

Debridement

Debridement is the removal of necrotic tissue, which is nonviable, devitalized or contaminated foreign matter in the wound, and is called eschar or slough. Eschar is defined as a collection of dead tissue within the wound. Slough is the stringy, devitalized tissue that adheres to the wound bed *[R]*.

Goals of Debridement

1. Accelerate wound healing
2. Decrease the risk of infection
3. Prevent further complications by reducing tissue destruction

There are four main mechanisms of debridement – sharp, enzymatic/chemical, mechanical, and autolytic. Prior to performing any type of debridement of the lower extremity or heel, the patient must be assessed for adequate blood supply by Doppler, ankle/brachial index, vascular studies, and a review of the patients past and present medical history. Do not remove dry eschar of the heel until circulatory status is confirmed *[R]*.

Refer to the original guideline document for additional information on sharp, enzymatic/chemical, mechanical, and autolytic debridement, whirlpool treatment, and larval therapy.

Surgical Repair

Pressure ulcers may be closed using surgical intervention in certain circumstances. Surgical repair of stage III or IV pressure ulcers is issued when other therapies have been implemented and patient healing is optimal. Recommendation is to consult a surgeon who is experienced in surgical repair of pressure ulcers.

3. **General Care**

Support Surfaces

Patients in the intensive care unit setting are at the highest risk for developing pressure ulcers. The support surface industry can be complex, ever changing, and biased. Patients with advanced skin breakdown (stage III or IV) need advanced pressure relief products. Patients with multiple stage sites may be appropriate for pressure relief surfaces *[R]*.

Support surfaces were identified appropriate for the treatment of stage III and IV ulcers and further provided the different characteristics of support surfaces to aid in selection. The study included coverage criteria and reimbursement guidelines for Medicare and other insurers *[R]*.

More research is needed to identify which particular mattress(es) are providing the best pressure relief *[R]*.

4. **Pain Management**

Pressure ulcers can be extremely painful, and it is important to assess for pain every patient with a pressure ulcer *[D]*. Assessment of pain should occur at regular intervals, which could include: on admission, with reassessments, routine vital signs, change in activity level, patient's report of pain, dressing changes, and after pain interventions *[D]*. Pharmacological and non-pharmacological pain relief measures should be considered to treat pressure ulcer pain. Use of analgesics and adjunctive therapies are important interventions to consider in alleviating the painful experience. The evidence for use of topical opioids on pressure ulcers for the treatment of pain has been variable *[A]*. Non-pharmacologic interventions could include repositioning, use of pressure relieving devices, relaxation techniques, guided imagery, music therapy, and distraction *[D]*.

5. **Bacterial Colonization/Infection**

It is important to differentiate between wound contamination, colonization, and infection. Contamination is the presence of bacteria on the wound surface without proliferation. All wounds are contaminated. Colonization is characterized by the presence and proliferation of microorganisms in a wound without a host response. This occurs frequently, particularly in chronic wounds such as stasis ulcers, and pressure ulcers *[R]*.

A wound infection occurs when the bacteria invade healthy viable tissue to proliferate to the point of overwhelming the host's immune response. The infection may be acute or chronic depending on the host's defense mechanisms *[R]*.

All chronic wounds, including pressure ulcers, have bacteria. The clinician needs to determine if the bacterial load in the wound is balanced or has critical colonization or infection.

The first sign of critical colonization or local infection may be a delay in healing and an increase in exudates. Critical colonization potentially can be treated with antimicrobial dressings such as silver preparations.

Diagnosis of wound infections is based on patient history and clinical findings. The standard for determining infection is tissue biopsy. Infection of the wound is often determined by a swab culture placed on healthy granulation tissue, pressed down and turned 360 degrees to extract fluid. Do not culture pus. Infection is indicated when bacteria counts reach 10^5. Infection must be treated with systemic antibiotics based on wound culture results. The signs and symptoms of wound infection depend on whether the wound is acute or chronic *[R]*.

In acute wounds, the classic signs of inflammation (redness, edema, pain, increased exudate, and periwound surface warmth) persist beyond the normal time frame of three to four days. In patients who are immunosuppressed, the signs of inflammation often are diminished or masked because these patients are unable to mount an effective immune response. Often the only clue to a wound infection is complaint of pain.

In a chronic wound, the signs may be more subtle. Signs may be:

- Increase in amount or change in characteristics of exudate
- Discolorization and friability of granulation tissue
- Undermining
- Abnormal odor
- Epithelial bridging (a bridge of epithelial tissue across a wound bed) at the base of the wound, or sudden pain *[R]*

Clinicians may find the mnemonics, NERDS and STONES helpful.

Helpful mnemonic for critical colonization:

NERDS

Non-healing wounds

Exudative wounds

Red and bleeding wound surface granulation tissue

Debris (yellow or black necrotic tissue) on wound surface

Smell or unpleasant odor from wound

Helpful mnemonic for deep infection:

STONES

Size is bigger

Temperature is increased

Os (probe to or expose bone)

New or satellite areas of breakdown

Exudate, erythema, edema

Smell

[R]

Removing non-viable tissue and bacteria through debridement and wound cleansing is important for reducing bacteria and avoiding adverse outcomes such as sepsis.

Clean periwound skin with facility-approved skin cleanser to prevent contamination of wound from periwound skin bacteria.

6. **Education**

Patient Education

Patient education is an important piece of pressure ulcer prevention and treatment. The patient, family and caregivers are key to prevention, management and treatment of pressure ulcers. Teaching materials should be given to the patient and family on admission or at the time risk is identified. Content of education should include causes of pressure ulcers, ways to prevent them, dietary needs, positioning, signs of infection, types of tissue, normal and abnormal colors of tissue, infection control, dressing change technique, goal and purpose. It should be in an appropriate reading level, organized, appealing and give easy-to-understand instructions. Family and caregivers should be brought into the hospital to have hands-on teaching on dressing changes to assess their ability to provide the care at home. Detailed written instructions should also be given to them to refer to at home. If the patient, family or caregiver is unable to do the actual treatment, the education still needs to be provided. Education should also be provided to the person or agency that will be doing the care, if the patient, family or caregiver is not able.

Staff Education/Training

Education and training for staff on identifying pressure ulcer risk, prevention and treatment needs to be done routinely to keep staff competent and current. Education should be based on the needs of the staff and appropriate to the patient population. Use of products, prevention methods and treatment needs to be offered in orientation and regular in-services on skin and wound care. Methods of education should be varied and include written, interactive, multidisciplinary, hands-on, and visual. These methods should also be easy to access.

For additional information, see the Support for Implementation section, Resources Available in the original guideline document.

7. **Discharge Plan/Transfer of Care**

At discharge or transfer of care to another department or facility, the patient's plan of care – including a thorough description, goal of treatment, stage of ulcer and follow-up should be communicated. Location, size, type, stage, description and current treatments should be communicated to ensure continuity of care and to decrease chance of further injury and to prevent delay of healing. If patient is at risk, special needs and interventions used should be communicated. The needs of the patient at home or place of discharge need to be assessed to ensure the patient has equipment and resources available. These include specialty bed, mattress, cushions, home care, supplies and nutrition.

Definitions:

Classes of Research Reports:

A. Primary Reports of New Data Collection

Class A:

- Randomized, controlled trial

Class B:

- Cohort study

Class C:

- Non-randomized trial with concurrent or historical controls
- Case-control study
- Study of sensitivity and specificity of a diagnostic test
- Population-based descriptive study

Class D:

- Cross-sectional study
- Case series
- Case report

B. Reports that Synthesize or Reflect upon Collections of Primary Reports

Class M:

- Meta-analysis
- Systematic review
- Decision analysis
- Cost-effectiveness analysis

Class R:

- Consensus statement
- Consensus report
- Narrative review

Class X:

- Medical opinion

CLINICAL ALGORITHM(S)

None provided

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EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is classified for selected recommendations (see "Major Recommendations").

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IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Institute for Clinical Systems Improvement (ICSI). Pressure ulcer treatment. Health care protocol. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2008 Jan. 28 p. [36 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2008 Jan

GUIDELINE DEVELOPER(S)

Institute for Clinical Systems Improvement - Private Nonprofit Organization

GUIDELINE DEVELOPER COMMENT

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GUIDELINE COMMITTEE

Committee on Evidence-Based Practice

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The Institute for Clinical Systems Improvement (ICSI) has adopted a policy of transparency, disclosing potential conflict and competing interests of all individuals who participate in the development, revision and approval of ICSI documents (guidelines, order sets and protocols). This applies to all work groups (guidelines, order sets and protocols) and committees (Committee on Evidence-Based Practice, Cardiovascular Steering Committee, Women's Health Steering Committee, Preventive & Health Maintenance Steering Committee, Respiratory Steering Committee and the Patient Safety & Reliability Steering Committee).

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No work group members have potential conflicts of interest to disclose.

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GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available from the Institute for Clinical Systems Improvement (ICSI) Web site.

Print copies: Available from ICSI, 8009 34th Avenue South, Suite 1200, Bloomington, MN 55425; telephone, (952) 814-7060; fax, (952) 858-9675; Web site: www.icsi.org; e-mail: icsi.info@icsi.org.

AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- Development and revision process for guidelines, order sets, and protocols. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2007 Jun. 5 p. Electronic copies: Available from the Institute for Clinical Systems Improvement (ICSI) Web site.

Print copies: Available from ICSI, 8009 34th Avenue South, Suite 1200, Bloomington, MN 55425; telephone, (952) 814-7060; fax, (952) 858-9675; Web site: www.icsi.org; e-mail: icsi.info@icsi.org.

PATIENT RESOURCES

None available

NGC STATUS

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