



**Surgical Standards for Surgeons Performing
Normothermic Regional Perfusion (NRP)**

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American Society of Transplant Surgeons

Standards & Quality Committee

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Surgical Standards for Surgeons Performing Normothermic Regional Perfusion (NRP)

The American Society of Transplant Surgeons (ASTS) is supportive of normothermic regional perfusion (NRP) as a modality for procurement in Donation after Circulatory Death (DCD) to optimize organ utilization and transplantation. The position of the ASTS regarding the medico-legal and ethical concerns of NRP as well as the Society's recommendations regarding the logistical and technical standards of NRP have been addressed and the relevant papers are included in the bibliography.ⁱ Many of these issues related to NRP are outside the scope of this document, including training of non-surgeons in procurements and recommendations on tracking quality of organs transplanted after NRP procurements. ASTS does highly recommend that NRP be performed by surgeons with qualifications listed in the certification pathways below.

NRP procurements are novel procedures that apply existing techniques. Specific expertise is required of the surgical teams and the organ procurement organization (OPO) staff involved. The performance of these procedures requires that the surgeon is competent in technical skills and operative tactics beyond standard DBD or DCD procurements.

Due to variations in hospital and state regulations, NRP training is not available to all transplant fellows in the United States. Surgeons may be trained in NRP during fellowship, after fellowship, or via a combination of fellowship and post-fellowship experience. In this document, "trainee" does not imply a fellow, but also any surgeon in the process of learning to perform NRP.

The purpose of this document is to put forth recommendations regarding the training requirements and standards for transplant surgeons performing NRP. ASTS recognizes that NRP is a rapidly changing and innovating technology and will review this document on an annual basis.

1. Medical Background and Prerequisites (as stated in the [ASTS Surgical Standards for Surgeons Performing Deceased Donor Organ Procurements for Transplantation](#))

a. Experience in Organ Transplantation:

- i. *A surgeon must have a US medical license or institutional license (form of restricted medical license to practice) and transplant training as outlined below:*
 1. *Have completed an ASTS-accredited transplant fellowship with a total of 25 multi-organ procurements, including five (5) DCD procurements (Qualified Transplant Surgeon) as stated in the [ASTS Surgical Standards for Surgeons Performing Deceased Donor Organ Procurements for Transplantation](#); or*
 2. *Have completed transplant training or organ procurement training in another format with a total of 25 multi-organ procurements (including five (5) DCD procurements) under the observation of a Qualified Transplant Surgeon, and obtain a letter of approval from one Qualified Transplant Surgeon.*

- ii. *A surgeon with an institutional license, restricted medical license, or international degree should:*
 - 1. *Have completed transplant training or organ procurement training in another format; and*
 - 2. *Have completed 25 multi-organ procurements (including five procurements (with or without NRP) under the observation of a Qualified Transplant Surgeon; and*
 - 3. *Provide documentation of review and approval from a Qualified Transplant Surgeon.*
 - 4. *Regardless of age or experience, a surgeon who has not completed an organ procurement in the last six (6) years and is not a practicing transplant surgeon should only perform organ recovery in the presence of a Qualified Transplant Surgeon. Supervision of one procurement and approval prior to independent procurements is sufficient to perform independent recoveries.*
- iii. Any surgeon performing NRP should be certified by the ASTS Procurement Certification Pathway (in development) or until this is developed, by **ACIN**: Association for Organ Procurement Organizations (AOPO) Credentials Information Network (ACIN).

2. NRP Certification Pathway for A-NRP:

a. Technical Skills and Procedural Training Phase 1 (5 cases/assistant)

- i. **These 5 cases should be performed as proctored (two surgeon) cases**
- ii. **Key Areas of Assessment**

- 1. **Organ Cannulation and Connection to NRP Circuit:** Surgeons must be skilled in cannulating vessels and connecting them to the NRP circuit without compromising organ integrity.
- 2. **Assessing Organ Viability:** Training in assessing organ function in real-time, including monitoring for physiological indicators of organ health, such as blood flow, oxygenation, and metabolic parameters.
- 3. **Managing Potential Complications:** Surgeons should be trained to handle complications like bleeding, equipment failure, or unexpected changes in perfusion dynamics.
- 4. **Documentation:** Training should address standardized documentation of NRP (see addendum)

b. Technical Skills and Procedural Training Phase 2 (5 cases/primary surgeon)

i. **These 5 cases should be performed as two surgeon cases (proctored)**

1. The surgeon in training should act as the primary cannulating surgeon for these cases.
2. Cannulation time within 10 minutes from incision must be achieved during these cases
3. Case logs should be maintained and provided when requested by appropriate regulatory bodies.

3. **Continuing Education and Skill Refreshers**

- a. ASTS recommends that OPOs track organs discarded due to technique for NRP procurements as part of quality metrics.
- b. As with all surgical skills, ASTS recommends ongoing education and learning for NRP in the form of:
 - i. **Attending Conferences and Workshops:** Keeping up with advancements in NRP by attending conferences, seminars, and continuing medical education (CME) events.
 - ii. **Case Review and Peer Learning:** Regular case reviews and peer learning sessions to discuss challenges, complications, and best practices in NRP.

Summary of Required Competencies for NRP:

- **Core Surgical Skills:** TACC certification preferable
- **Technical Proficiency:** Hands-on skill with NRP equipment and techniques.
- **Decision-Making Ability:** Competence in assessing and managing organ viability and potential complications.
- **Ethical and Communication Skills:** Training in ethical practices and effective communication with transplant teams.
- **Ongoing Education:** Commitment to continuous learning and staying updated with advancements in the field.

Addendum

ASTS recommend utilization of the previously developed ASTS Normothermic Regional Perfusion Form found at: https://cdn-links.lww.com/permalink/tp/d/tp_1_1_2024_06_26_newfiles_1_sdc1.pdf

ⁱ Wall AE, Merani S, Batten J, Lonze B, Mekeel K, Nurok M, Prinz J, Gil J, Pomfret EA, Guarrera JV. American Society of Transplant Surgeons Normothermic Regional Perfusion Standards: Ethical, Legal, and Operational Conformance. *Transplantation*. 2024 Aug 1;108(8):1655-1659. doi: 10.1097/TP.0000000000005115. Epub 2024 Jul 17. PMID: 39012935.

Croome K, Bababekov Y, Brubaker A, Montenovo M, Mao S, Sellers M, Foley D, Pomfret E, Abt P. American Society of Transplant Surgeons Normothermic Regional Perfusion Standards: Abdominal. *Transplantation*. 2024 Aug 1;108(8):1660-1668. doi: 10.1097/TP.0000000000005114. Epub 2024 Jul 17. PMID: 39012956.