NeoCor

INSTRUCTIONS FOR USE
TiAra Valve

Biological aortic valve prosthesis TiAra in accordance with Technical Specification (TU) 9444-015-57628698-2016 (hereinafter, the valve)

Sterile components:
TiAra valve and holder (holder and holder handle).
Non-sterile components:
Exterior of the storage container.

Symbol	Designation	Symbol	Designation
	Consult the Instructions for Use		Do Not Reuse
	Sterilized Using Aseptic Technique		Do Not Use if Package is Damaged
	Catalog Number		Use By
	Caution! Consult the Instructions for Use		Temperature Range
	Manufacturer		Serial Number
	Sterilized Using Liquid Chemical Sterilant		Do Not Resterilize
	Treated with sodium hydroxide		

VALVE DESCRIPTION:

TiAra aortic valve (see Figure 1) is a stented valve with xenopericardium leaflets intended for supra-annular implantation in the aortic position. The valve prosthesis is designed with a flexible stent made of superelastic nitinol wire and covered with bovine pericardium. The valve stent cover made of the biological tissue allows to perform special treatment of its entire surface.
Valve leaflets are made of bovine pericardium. Ethylene glycol diglycidyl ether is used to chemically cross-link the pericardium. Anti-prion treatment of the pericardium is performed with 1 molar sodium hydroxide for 60–75 minutes at 20–25°C. The TiAra valves are sterilized with a liquid chemical agent: 1% chlorhexidine.The TiAra valve is supplied sterile. The valve manufacturing process includes anticalcification treatment. The valve is stored in a 0.3% paraben mix solution.

Valve Design Variants

Size, mm	Catalog Number REF
19	TA19
21	TA21
23	TA23
25	TA25
Type of treatment:	
- Anticalcification	

The scope of delivery includes:

Component	Quantity, pcs.
TiAra Valve	1
Holder (handle and holder)	1
Container filled with the storage solution	1
Instructions for Use	1
Implantation registration form	1
Identification stickers	2
Carton	1
Carton insert	2

INDICATIONS

The TiAra valve is intended for use in cardiac surgery as a substitute for the incompetent human aortic heart valve or a previously implanted aortic heart valve prosthesis.

CONTRAINDICATIONS

None known. They are determined by a physician in each individual case.

WARNINGS

- For single use only.
- Do not resterilize the valve by any method.
- The valve size depends on the size of the recipient annulus and anatomical features of the sinotubular junction. Implantation of the valve with a size larger than that of the annulus is not recommended, as it may result in stent deformation, valvular incompetence, and/or damage to the surrounding tissues. Do not use an inappropriately large valve! The valve dimensions are presented in Table 1. Perform preoperative echocardiography to select an optimal valve size.
- Passage of a catheter through any part of the bioprosthesis may damage the valve and is therefore not recommended.
- Accelerated deterioration of the biological tissue of the leaflets due to calcific degeneration may occur in:
  - Children, adolescents, or young adults
  - Patients with altered calcium metabolism (e.g., patients with hyperparathyroidism or chronic renal failure)
  - Individuals requiring hemodialysis
- Maintenance and repair of the valve are not provided for by the manufacturer and are not required for its intended use. The valve prostheses are intended for single use only and must not be resterilized.

Do not use the device if:
- The valve sterility has been compromised; the valve has been damaged, or if there are any other defects.
- Expiration date elapsed
- The tamper-evident label is damaged, broken, or missing, or if fluid is leaking from the container.
- The storage solution does not completely cover the valve.

PRECAUTIONS

- The safety and efficacy of TiAra have not been studied in the following specific populations:
  - Pregnant women
  - Nursing mothers
  - Patients with chronic kidney failure
  - Patients with aneurysmal aortic degenerative conditions
  - Patients with active endocarditis
  - Children, adolescents, or young adults
- The holder handle is supplied sterile. Make sure that the "sterile until" date indicated on the carton has not elapsed. Do not use the holder handle if there are cracks or any other signs of deformation on it.
- Position the valve so that the stent does not obstruct the coronary ostia.
- Do not place the non-sterile valve storage container in the sterile field.
- Do not expose the valve to solutions other than the storage solution in which it is supplied by the manufacturer.
- The sterile saline is used to rinse the valve and irrigate it during implantation.
- Do not add antibiotics to either the valve storage solution or the rinse solution.
- Do not apply antibiotics to the valve.
- Do not allow the valve tissue to dry. Place the valve in the sterile saline rinse solution immediately upon removal from the valve storage solution. The valve must be periodically irrigated during implantation.
- Do not use the valve if the temperature indicator has changed its color, or if the valve has been improperly stored in temperature conditions outside of the +5°C to +40°C range.
- Do not implant the valve without thoroughly rinsing as directed.
- Use caution during suturing to avoid laceration of the valve tissue. If the valve is damaged, it must be replaced!
- Do not attempt to eliminate any defects of the valve! The damaged valve must not be used!
- Do not use unprotected forceps or sharp instruments, since they may cause structural damage to the valve.
- Use caution when tying knots to avoid deformation and damage of valve stent posts.
- Never handle the valve leaflets.
- Avoid prolonged contact with the storage solution. Immediately after contact, thoroughly flush any skin exposed to the solution with water. In case of contact with eyes, flush with water and seek appropriate medical care.

MRI Safety Information
The tests showed that the valve can be safely scanned under the following conditions:
- Static magnetic field of 3 Tesla or less
- Spatial gradient of 525 Gauss/cm or less
- Maximum whole-body-averaged specific absorption rate (SAR) of 2.0 W/kg for 15 minutes of scanning

Pre-clinical trials demonstrated that TiAra produced a maximum temperature rise of was less than or equal to 0.5°C when exposed to a maximum whole-body-averaged SAR of 2.0 W/kg for 15 minutes of continuous scanning in a 3-MR system. MR image quality may be compromised if the area of interest is relatively close to the position of the bioprosthesis.

ADVERSE EVENTS

Adverse events potentially associated with the use of bioprosthetic heart valves include:
- high transprosthetic regurgitation
- hemolytic anemia
- stroke
- myocardial infarction
- hemorrhage
- cardiac arrhythmia
- increased hemolysis
- paraprosthetic regurgitation
- valve stenosis
- angina
- heart failure
- thromboembolism
- valve thrombosis
- endocarditis

It is possible that these complications could lead to:
- reoperation
- persistent disability
- death

CLINICAL STUDIES

Currently, TiAra biological aortic heart valve prosthesis is tested for compliance with Technical Specifications (TU) No. 9444-015-57628698-2016 in the course of clinical trials.
The manufacturer offers all the interested clinics to take part in the clinical trials. To learn more about participation in the trials, refer to contact information given in these Instructions.

PACKAGING AND STORAGE

The valve is supplied with the holder attached to it with three retaining sutures. The holder is intended to facilitate the treatment and handling when removing the valve from the container, and during rinse and implantation.
The valve is stored in 0,3% solution of mixture of Methylparaben and Ethylparaben.
Store the valve in the vertical position.

CAUTION: Do not implant the valve without thoroughly rinsing as directed.
WARNING: Do not use the valve if the temperature indicator has changed its color, or if the valve has been improperly stored in temperature conditions outside of the +5°C to +40°C range.

INSTRUCTIONS FOR USE

Read the Instructions for Use of TiAra, where procedures for handling and rinsing are provided, as well as implantation particulars.

WARNING: The valve size depends on the size of the recipient annulus and anatomical features of the sinotubular junction. Implantation of the valve with a size larger than that of the annulus is not recommended, as it may result in stent deformation, valvular incompetence, and/or damage to the surrounding tissues. Do not use inappropriately large valves! The valve dimensions are presented in Table 1. Perform preoperative echocardiography to select an optimal valve size.

Preimplant Handling

TiAra is supplied in a container with a tamper-evident label. The contents of the container are sterile; the container itself requires aseptic treatment before being placed into the sterile field to prevent contamination.

Warnings
- Do not use the valve if the expiration date has elapsed.
- Do not use the valve if the fluid is leaking from the packaging.
- Do not resterilize the valve by any method.

Valve Removal from the Carton

Precautions
- Do not place the non-sterile valve storage container in the sterile field.
- Do not expose the valve to solutions other than the storage solution in which it is supplied by the manufacturer. The sterile saline is used to rinse and irrigate the valve.
- Do not add antibiotics to either the valve storage solution or the rinse solution.
- Do not apply antibiotics to the valve.

1. The surgeon selects the correctly sized valve.
2. After you remove the valve storage container from the carton, examine it for signs of damage.

WARNING: Do not use the valve if the tamper-evident label is damaged, broken, or missing, or if fluid is leaking from the packaging.
WARNING: Do not use the valve if you discover that it is not completely covered by the storage solution.

3. Check the valve size and expiration date indicated on the label.
4. To remove the valve from the storage container, cut in the tamper-evident label and unscrew the lid.

CAUTION: Avoid prolonged contact with the storage solution. Immediately after contact, thoroughly flush any skin exposed to the solution with water. In case of contact with eyes, flush with water and seek appropriate medical care.

Valve Removal from the Storage Container

1. Prepare the holder handle.
2. Screw the handle into the holder fixed to the valve as shown in Figure 2.
3. Remove the valve and the protective plastic glass from the storage container.

CAUTION: Do not use unprotected forceps or sharp instruments, since they may cause structural damage to the valve.
CAUTION: Never handle the valve leaflets.

4. Put on the gloves and remove the valve from the protective plastic glass as shown in Figure 3.
5. Check the valve for damage. DO NOT implant the valve if there are any signs of damage or defects.

Rinse Procedure

CAUTION: Do not implant the valve without thoroughly rinsing.

1. Prepare two basins in the sterile field and fill each of them with not less than 500 mL of the sterile saline.
2. Using the holder handle, fully immerse the valve, the holder, and the portion of the holder handle in the sterile saline in the first basin as shown in Figure 4.
3. Rinse the valve for two minutes, using a gentle back-and-forth motion.
4. Repeat Steps 2 and 3 in the second basin.
5. After rinsing, leave the valve immersed in the second basin until required for implantation by the surgeon.

CAUTION: Do not allow the valve tissue to dry. Place the valve in the saline immediately upon removal from the storage solution. During implantation, the valve must be periodically irrigated with the saline.

Surgical Guidelines

Only surgeons trained in cardiac surgery techniques are allowed to implant the valve. Due to the complexity of the surgical procedure for replacement of the valve, the choice of the implantation technique, as well as pre- and postoperative treatment is left to the discretion of the individual surgeon with account of these instructions.
When implanting in the supra-annular position, it is not recommended to use the mattress suture.
Make sure the suture material is not in the contact with the leaflets.

Precautions
- Do not allow the valve tissue to dry. Place the valve in the sterile saline rinse solution immediately upon removal from the valve storage solution. The valve must be periodically irrigated during implantation.
- Use caution during suturing to avoid laceration of the valve tissue. If the valve is damaged, it must be replaced.
- Do not attempt to eliminate any defects of the valve! The damaged valve

must not be used!

VALVE IMPLANTATION

To obtain the optimal hemodynamic results, the valve should be implanted in the supra-annular position.

1. Choose the appropriately sized valve.
2. To protect the leaflets and preserve their coaptation, keep to the following order of manipulations:
   - Place the valve on the holder above the aortic annulus (supra-annularly).
     WARNING: Position the valve so that the stent does not obstruct the coronary ostia.
   - Fix the valve with the twisted suture, involving the wire stent.
   - To remove the holder from the valve, cut three retaining sutures as shown in Figure 5 and pull the handle.
     WARNING: The holder may be unfastened from the valve only after the valve has been fully fixed to the annulus.
3. After removing the holder, make sure that there are no residual threads by which the holder was retained.

INTRAOPERATIVE ASSESSMENT

It is recommended to perform the intraoperative assessment of the valve function with transesophageal Doppler echocardiography.

PATIENT REGISTRATION

Each valve is supplied with the Identification Card, identification sticker for the medical record and a mail envelope to be sent to the manufacturer.

Please, fill in the Identification Card after implantation and send it to NeoCor CJSC.

Control by the manufacturer is mandatory in some countries. Disregard any request for patient information if this contradicts your local legal or regulatory requirements regarding patient personal data.

POSTOPERATIVE CARE

Anticoagulant and/or Antiplatelet Therapy

As a rule, it is recommended to maintain patients with the biological heart valve prosthesis on the anticoagulant therapy for 24 weeks after implantation.

Long-term anticoagulant therapy, unless contraindicated, is recommended for all patients with biological heart valve prosthesis who have risk factors for thromboembolism.

If prosthetic dysfunction develops in the long term, the decision can be made, based on results of the medical examination, to remove and replace the valve. The explanted valves shall be returned to the manufacturer.

PATIENT COUNSELING INFORMATION

Long-term anticoagulant therapy, unless contraindicated, is recommended for all patients with bioprosthesis who have risk factors for thromboembolism.

Prophylactic antibiotic treatment is recommended in invasive procedures (tooth extraction, cavity probing, etc.).

Control of blood coagulation parameters is recommended in anticoagulant therapy.

SHIPPING AND STORAGE

TiAra packed in the shipping container is shipped in the covered vehicles at +5°C to +40°C by any transport. The carton contains the temperature indicator triggering in case of the inappropriate temperature range of shipping and storage.

DIRECTIONS FOR USE

1. The rules for the valve handling outlined in the Instructions for Use shall be observed.
2. The valves shall be disposed of (or destroyed) in accordance with Sanitary Regulations and Standards (SanPiN) 2.1.7.2790-10.
3. Maintenance and repair of the valve are not provided for by the manufacturer and are not required for its intended use. The valve prostheses are intended for single use only and must not be resterilized.

WARRANTY

NeoCor CJSC guarantees that the TiAra valve complies with Technical Specifications (TU) 9444-015-57628698-2016 provided that these instructions for use, and the condition of shipping, and storage are followed. THIS WARRANTY IS IN LIEU OF AND EXCLUDES ANY OTHER WARRANTIES NOT EXPRESSLY SET FORTH HEREIN, EXPRESS OR IMPLIED BY OPERATION OF LAW OR OTHERWISE INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, since treatment, storage, rinse, sterility of this device, as well as the patient-related factors such as diagnostics, treatment, surgical procedure and other concerns that are beyond NeoCor CJSC control directly impact the device and results of its use. NeoCor CJSC SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL LOSS, DAMAGE OR EXPENSE, directly or indirectly arising from the use of this device other than the replacement of all or part of it. NeoCor CJSC neither assumes nor authorizes any other person to assume for it any other additional liabilities related to this device.

This limited warranty grants you certain legal rights. You may have other rights that vary depending on the jurisdiction.

Description of specifications appearing in the documents of NeoCor CJSC are meant solely to generally describe the device during manufacturing and do not constitute any additional warranties.

Table 1: Valve Dimensions and Weight

Model	Bore diameter (size), mm	Height, mm	Aortic protrusion, mm	Weight, g (not more than)
TiAra TA19	19.0±1.0	16.6±1.5	10.1±1.0	2.1±0.5
TiAra TA21	21.0±1.0	17.8±1.5	10.1±1.0	2.3±0.5
TiAra TA23	23.0±1.0	19.0±1.5	10.1±1.0	2.5±0.5
TiAra TA25	25.0±1.0	20.2±1.5	10.1±1.0	2.6±0.5

Table 2: TiAra Performance Characteristics Established in the course of Bench Tests (Manufacturer's Data)

Parameter	Bore diameter (size), mm				P
	19	21	23	25	
Effective Orifice Area, cm^2	1.78–2.44	2.22–3.04	2.66–3.70	3.17–4.42	<0.05
Mean ΔP, mm Hg, min–max	6.1–14.6	5.5–13.6	5.4–12.8	5.1–12.3	<0.05
Regurgitant Fraction, %	6.7–10.1	6.5–10.3	6.1–10.5	6.6–9.8	<0.05

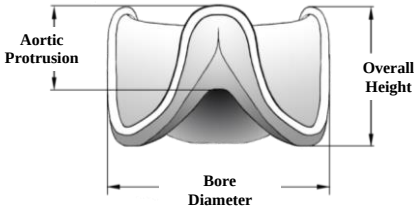

Figure 1: TiAra Biological Aortic Heart Valve Prosthesis

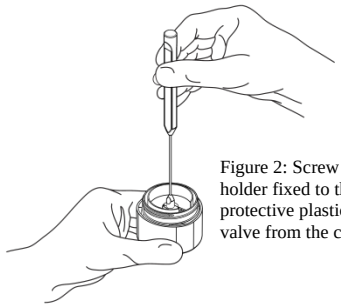

Figure 2: Screw the handle into the holder fixed to the valve, remove the protective plastic glass containing the valve from the carton.

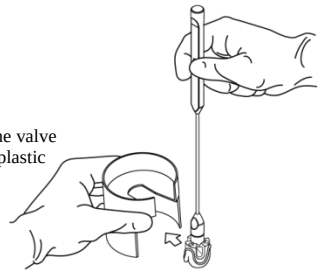

Figure 3: Remove the valve from the protective plastic valve.

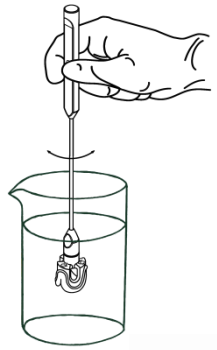

Figure 4: Rinse the valve in the sterile saline for 4 minutes, changing the saline twice (every 2 minutes).

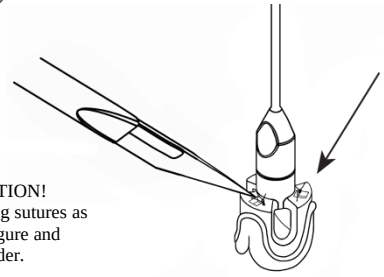

Figure 5: CAUTION! Cut the retaining sutures as shown in the figure and remove the holder.

Notes:

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Kemerovo, Sosnovy bulvar, d 6
e-mail: neocor@neocor.ru
web: www.neocor.ru

Manufactured site:
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Kemerovo,
ul. Volgogradskaya, d. 32

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