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	Effective Date:	12-30-2021
	Document Type:	Standard Operating Procedure
	Page Number:	1 of 8
	Department/Section:	Non-Invasive Cardiovascular Imaging Sciences
	Document Title:	<b>RENAL ARTERY DUPLEX STUDY</b>

**PURPOSE:**

To provide a guidelines on how to perform the procedure to the patient correctly.

**SCOPE:**


Applies to all Non-Invasive Cardiovascular Imaging Sciences (NICIS) staffs of Dr. Pablo O. Torre Memorial Hospital

**RESPONSIBLE PERSON:**

Cardiologist (Vascular Medicine Specialist), Cardiovascular Technician (Registered nurse), allied Healthcare professionals who have undergone training or with certification.

**GENERAL GUIDELINES:**

1. All renal duplex procedures should require a physician's order and a signed consent from the patient.
2. Patient should have an appointment or schedule on the day of procedure. List of preparations is given upon scheduling, preferably given by the performing Vascular Consultant.
3. Infection control measures should be adhered to in accordance to policies like handwashing, use of PPE'S and proper disposals of linens and supplies.
4. The Cardiovascular Technician must ensure the comfort, safety, security and general condition of a patient throughout the procedure.
5. The Cardiovascular Technician instructs the patient to kindly remove any jewelry, or other objects that may interfere with the scan.
6. Results will be released to out-patients upon presentation of the Official Receipt (OR) or HMO ID for charged clients.

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**PROCEDURE:**

**EQUIPMENT:**

1. Color Duplex ultrasound scanner machine (HDI 5000 or HD11-XE)
2. Low frequency transducer / select frequency appropriate to body habitus  
2.0 – 3.0 MHz Transducer curved Array 5-2 with Doppler and/or color Doppler capabilities)
3. Warm acoustic coupling gel
4. Recording device (VHS tape or Compact disc and thermal paper)


**PATIENT PREPARATION:**

1. The patient should fast 8-12 hours before the scheduled procedure to minimize bowel gas.
2. Take Dulcolax tablets (2 tabs at 4pm and 2 tabs at 8pm).
3. Take Pankreoflat (2 tabs at 4pm and 2 tabs at bedtime).
4. Insert 1 Dulcolax suppository in early morning.

**OUT-PATIENT PRE-EXAMINATION PROCEDURES:**

- 1 The client presents a written request from his/her attending or referring physician to the Nurse Technician.
- 2 The Nurse Technician makes sure that the patient has complied with the preparations and processes the requested abdominal aorta and its branches duplex procedure on the Bizbox Hospital computer system after the patient had completely filled up the admission data and consent form.
- 3 The Nurse Technician informs the examining Vascular Consultant once the patient arrives in the unit.
- 4 The Nurse Technician prepares the ultrasound machine, inputs the patient's data and sets the equipment for proper test documentation.
- 5 The Nurse Technician introduces self to patient and assists him/her in changing to hospital gown maintaining the patient's privacy and confirms the patient's identity by interview based on the data given on the admission slip.




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- 6 The Nurse Technician assesses the patient prior to the venous duplex evaluation which includes patient's ability to tolerate the procedure, potential contraindications to the procedure and physical assessment.
- 7 The Nurse Technician explains to the patient the necessity and the time duration of the procedure.
- 8 The Nurse Technician positions the patient in supine position with the head slightly elevated to a level of comfort. The lateral decubitus position may be useful when supine acoustic windows prove inadequate or in individuals with a large abdominal girth exposing only the areas to be examined (abdominal area).
- 9 The Vascular Nurse Technician instructs the patient for the proper breathing technique.

#### **DIRECT EXAMINATION PROCEDURES:**

- 1 Place the transducer below the xiphoid process and angle cephalad. Evaluate with color duplex, the proximal abdominal aorta at the level of the celiac and superior mesenteric artery (SMA). Measure the peak systolic velocity of the aorta at the level of the SMA.
- 2 Briefly evaluate with duplex the SMA and the celiac axis for stenosis in transverse projection.
- 3 Angle the transducer distally to visualize the aorta longitudinally.
- 4 Angle the transducer slightly towards the right flank to evaluate the right renal artery. Record flow signals at origin, proximal and mid segments.
- 5 Angle the transducer toward the patient's left side to evaluate the left renal artery and document.
- 6 With patient lying on his side, arms stretched towards the head, image the right kidney and measure greatest length of kidney in long axis. Evaluate kidney for cysts, mass, hydronephrosis or other abnormalities.
- 7 Adjusting equipment settings for low flow state, evaluate parenchymal flow and record Doppler signals in the hilum, medulla, and cortex (3 sites).


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- 8 Angle the probe towards the patient's aorta to best visualize the length of the right renal artery and evaluate with duplex from distal to proximal segment; record flow signals.
- 9 With patient lying on the right side and left arm stretched towards head, evaluate distal left renal artery, left kidney and kidney flow.

**POST EXAMINATION PROCEDURES:**

- 1 The Nurse Technician removes the excess gel by wiping it off gently and asks the patient to wait while the ultrasound images are being reviewed by the Vascular Medicine Specialist.
- 2 The Nurse Technician gives instructions that the results are released 1-2 days after the Vascular Consultant Specialist had affixed his/her signature and are considered official.
- 3 The Vascular Consultant Specialist will analyze the images and may discuss with the referring physician about his/her findings on the ultrasound procedure.
- 4 The Nurse Technician submits to the Vascular Consultant the filled-up worksheet of result for the final interpretation of the test.
- 5 The Nurse Technician encodes final result in the Bizbox hospital computer system, prints them out for signing. The official results are then ready for sorting and releasing. The patient's data with the date and time of the procedure is being recorded in the vascular procedures log book for future reference.
- 6 The Nurse Technician does after care of the machine by wiping the excess gel on the probe and softly coils the wires and after which the probe is secured on its proper place to be ready for the next patient.
- 7 The Nurse Technician switches off the machine when not in use to conserve energy and should be covered to free it from dust.




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### **IN-PATIENT PRE-EXAMINATION PROCEDURE:**

1. The staff nurse on duty encodes request on the bizbox computer system and schedules patient upon receiving doctor's order for abdominal aorta and its branches duplex study.
2. Nurse technician renders request for the procedure. All rendered request are automatically charged to the patient's account.
3. The Nurse Technician calls the station to bring down the patient at the NICIS Department before the scheduled time.
4. The Nurse Technician informs the examining Vascular Medicine Specialist once the patient arrives in the unit.
5. The Nurse Technician prepares the ultrasound machine, inputs the patient's data and sets the equipment for proper test documentation.
6. The Nurse Technician introduces self to patient and assists him/her in changing to hospital gown maintaining the patient's privacy and confirms the patient's identity using the two patient identifier.
7. The Nurse Technician assesses the patient prior to the procedure which includes patient's ability to tolerate the procedure, potential contraindications to the procedure and physical assessment.
8. The Nurse Technician explains to the patient the necessity and the time duration of the study.
9. The nurse technician positions the patient in supine position with the head slightly elevated to a level of comfort. The lateral decubitus position may be useful when supine acoustic windows prove inadequate or in individuals with a large abdominal girth exposing only the areas to be examined (abdominal part).


**(Direct Exam Procedures: Refer to Out-Patient Direct Examination Procedures)**

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### POST-EXAMINATION PROCEDURES:


- 1 The Nurse Technician removes the excess gel by wiping it off gently and asks the patient to wait while the ultrasound images are being reviewed by the Vascular Consultant.
- 2 The Nurse Technician gives instructions that the results are released 1-2 days after the Vascular Consultant Specialist had affixed his/her signature and are considered official.
- 3 The patient is brought back to the room/ward and instructed to resume the previous diet unless ordered by physician otherwise.
- 4 The Vascular Consultant will analyze the images and may discuss with the referring physician about his/her findings on the ultrasound procedure.
- 5 The Nurse Technician submits to the Vascular Consultant the filled-up worksheet of result for the final interpretation of the test.
- 6 The Nurse Technician encodes final result in the Bizbox hospital computer system, prints them out for signing of the vascular consultant. The official results are then ready for sorting and releasing. The patient's data with the date and time of the procedure is being recorded in the procedure log book for future reference.
- 7 The Nurse Technician does after care of the machine by wiping the excess gel on the probe and softly coils the wires and after which the probe is secured on its proper place to be ready for the next patient.
- 8 The Nurse Technician switches off the machine when not in use to conserve energy and should be covered to free it from dust.



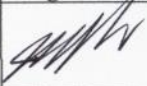
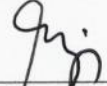

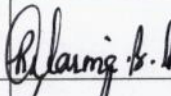
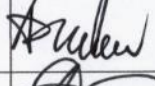
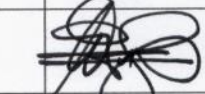
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### TURN AROUND TIME (TAT)


<b>PRE-EXAMINATION PROCEDURES:</b>	<b>TIME</b>
1. Completion of pre-exam paperwork	1 minute
2. Exam charging and billing activities	3 minutes
3. Exam room and equipment preparation	3 minutes
4. Patient preparation and positioning	3 minutes
<b>DIRECT EXAMINATION PROCEDURES:</b>	
1. Equipment optimization and the actual hands-on time.	45-60 minutes
<b>POST-EXAMINATION PROCEDURES:</b>	
1. Cleanup	5 minutes
2. Review exam data for preliminary and/or formal interpretation by Vascular Consultant.	15 minutes
<b>Total:</b>	<b>Approximately 1 hour and 30 minutes</b>

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**APPROVAL:**

	Name/Title	Signature	Date
Prepared by:	<b>MA. LLANA LINDA D. CARDONES, RN</b> NICIS Supervisor		01-25-2022
Verified:	<b>BONIFACIO C. SEPICO, RMT</b> Department of Imaging Sciences Manager		1/24/22
Reviewed by:	<b>DENNIS C. ESCALONA, MN, FPCHA, FPSQua</b> Quality Assurance Supervisor		1/27/2022
Recommending Approval:	<b>ROSARIO D. ABARING, RN, MN, PhD, FPCHA</b> Ancillary Division Officer		02-02-2022
	<b>HENRY F. ALAVAREN, MD, FPSMID, FPSQua</b> Total Quality Division Officer		2/3/2022
Approved:	<b>GENESIS GOLDI D. GOLINGAN</b> President & CEO		3/3/22




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		Document Title:	<b>RENAL ARTERY DUPLEX STUDY</b>

<b>OUT-PATIENT PRE-EXAMINATION PROCEDURE</b>	
<b>KEY TASK</b>	<b>PERSON RESPONSIBLE</b>
1. Presents a written request from the Attending or Referring Physician.	Patient
2. Encodes the request on the Bizbox Hospital computer system.	Nurse Technician
3. Informs the examining Vascular Consultant and prepares the ultrasound machine and inputs the patient's data.	
4. Introduces self to patient and assists him/her in changing to hospital gown maintaining the patient's privacy.	
5. Assesses the patient prior to the venous duplex evaluation.	
6. Explains to the patient the necessity and the time duration of the study.	
7. Positions the patient in supine position with the head slightly elevated to a level of comfort.	
8. Instructs the patient for the proper breathing technique.	
9. Performs direct examination according to different approaches.	


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<b>OUT-PATIENT POST-EXAMINATION PROCEDURE</b>	
<b>KEY TASK</b>	<b>PERSON RESPONSIBLE</b>
1. Removes the excess gel by wiping it off gently and gives instructions that the results are released 1-2 days after.	Nurse Technician
2. Analyzes and discusses the images with the Referring Physician.	Vascular consultant
3. Submits to the Vascular Consultant the filled-up worksheet of result for the final interpretation of the test.	Nurse Technician
4. Encodes final result in the Bizbox hospital computer system.	
5. Does after care of the machine by wiping the excess gel on the probe place.	




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<b>IN-PATIENT PRE-EXAMINATION PROCEDURE</b>	
<b>KEY TASK</b>	<b>PERSON RESPONSIBLE</b>
1. Encodes request on the bizbox computer system and schedules the patient.	Nurse-on-duty
2. Renders request for the procedure and instructs the Nurse-on-duty regarding patient preparation.	Nurse Technician
3. Calls the Station to bring down the patient at the NICIS Section.	
4. Informs the examining Vascular Medicine Specialist once the patient arrives in the unit.	
5. Prepares the ultrasound machine, inputs the patient's data and sets the equipment.	
6. Introduces self to patient and assists him/her in changing to hospital gown maintaining the patient's privacy.	
7. Assesses the patient prior to the procedure.	
8. Explains to the patient the necessity and the time duration of the study.	
9. Positions the patient in supine position with the head slightly elevated to a level of comfort.	

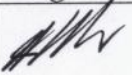
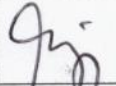
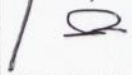


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<b>IN-PATIENT POST-EXAMINATION PROCEDURE</b>	
<b>KEY TASK</b>	<b>PERSON RESPONSIBLE</b>
1. Removes the excess gel by wiping it off gently and gives instructions that the results are released 1-2 days after.	Nurse Technician
2. Analyzes and discusses the images with the Referring Physician about his/her findings on the ultrasound procedure.	
3. Submits to the Vascular Consultant the filled-up worksheet of result for the final interpretation.	
4. Encodes final result in the Bizbox hospital computer system and prints them out.	
5. Does after care of the machine by wiping the excess gel on the probe and softly coils the wires.	
6. Switches off the machine when not in use to conserve energy.	



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**APPROVAL:**

	Name/Title	Signature	Date
Prepared by:	<b>MA. LLANA LINDA D. CARDONES, RN</b> NICIS Supervisor		5-12-22
Verified:	<b>BONIFACIO C. SEPICO, RMT</b> Department of Imaging Sciences Manager		5/26/22
Reviewed:	<b>DENNIS C. ESCALONA, MN, FPSQua</b> Quality Assurance Supervisor		06/30/2022
Recommending Approval:	<b>ROSARIO D. ABARING, RN, MN, PhD, FPCHA</b> Ancillary Services Division Officer		07.01.2022
	<b>HENRY F. ALAVAREN, MD, FPSMID, FPSQua</b> Total Quality Division Officer		7/7/22
Approved:	<b>GENESIS GOLDI D. GOLINGAN</b> President and CEO		



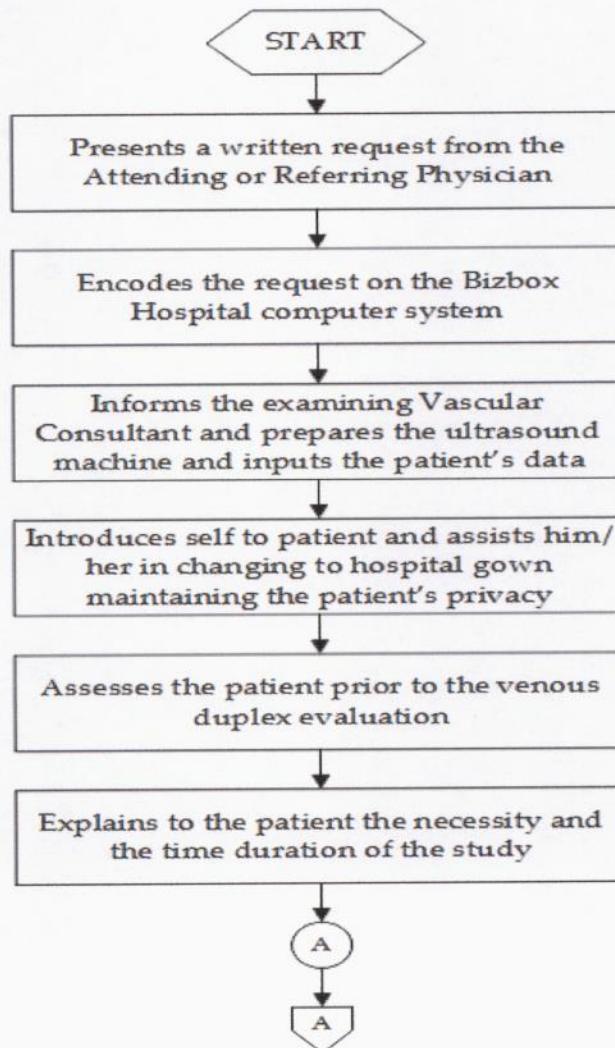
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## FLOWCHART

### OUT-PATIENT PRE-EXAMINATION PROCEDURE



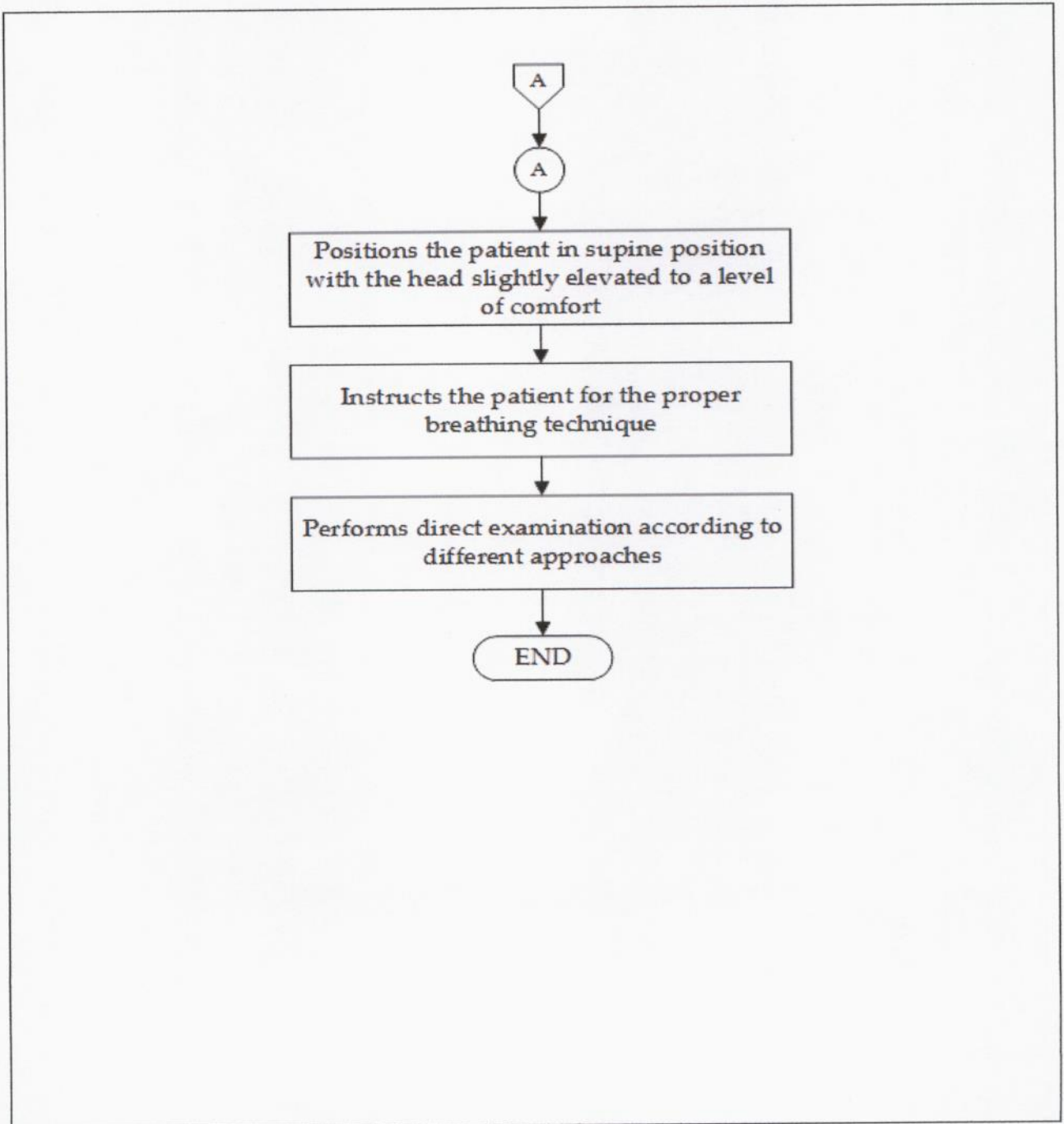




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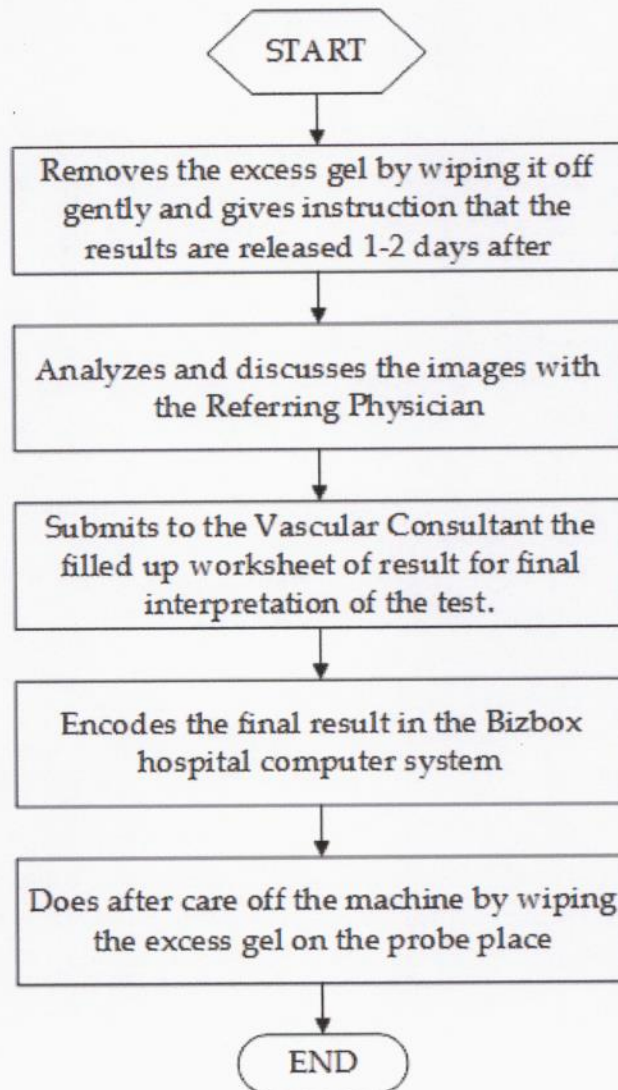


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### OUT-PATIENT POST-EXAMINATION PROCEDURE





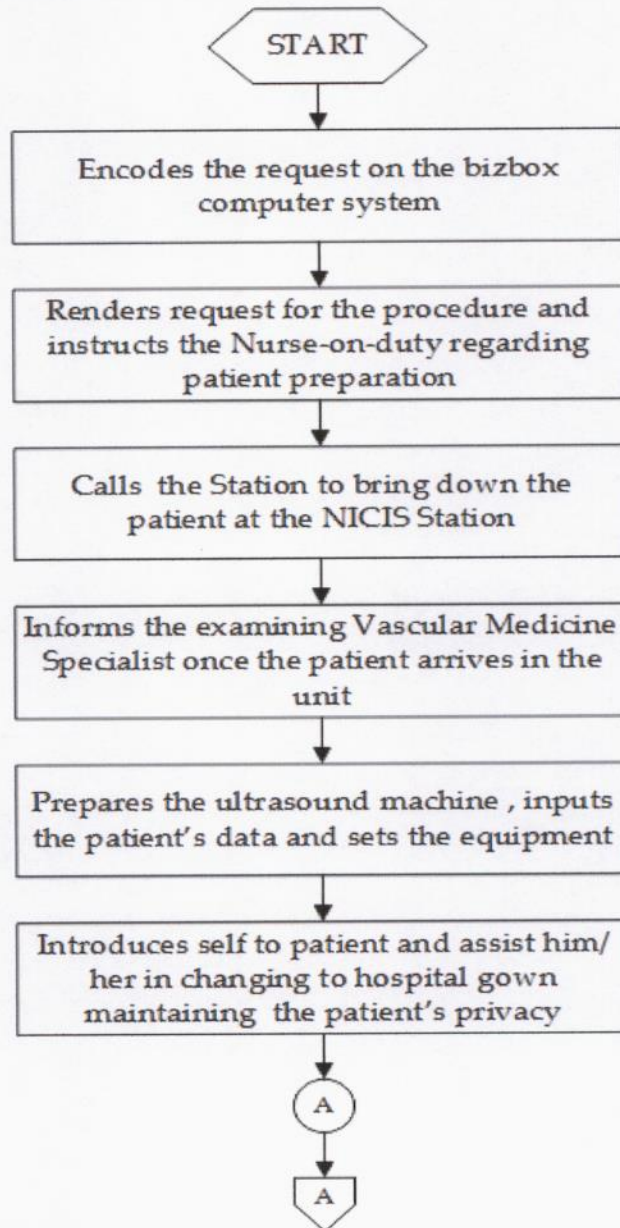


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## IN-PATIENT PRE-EXAMINATION PROCEDURE

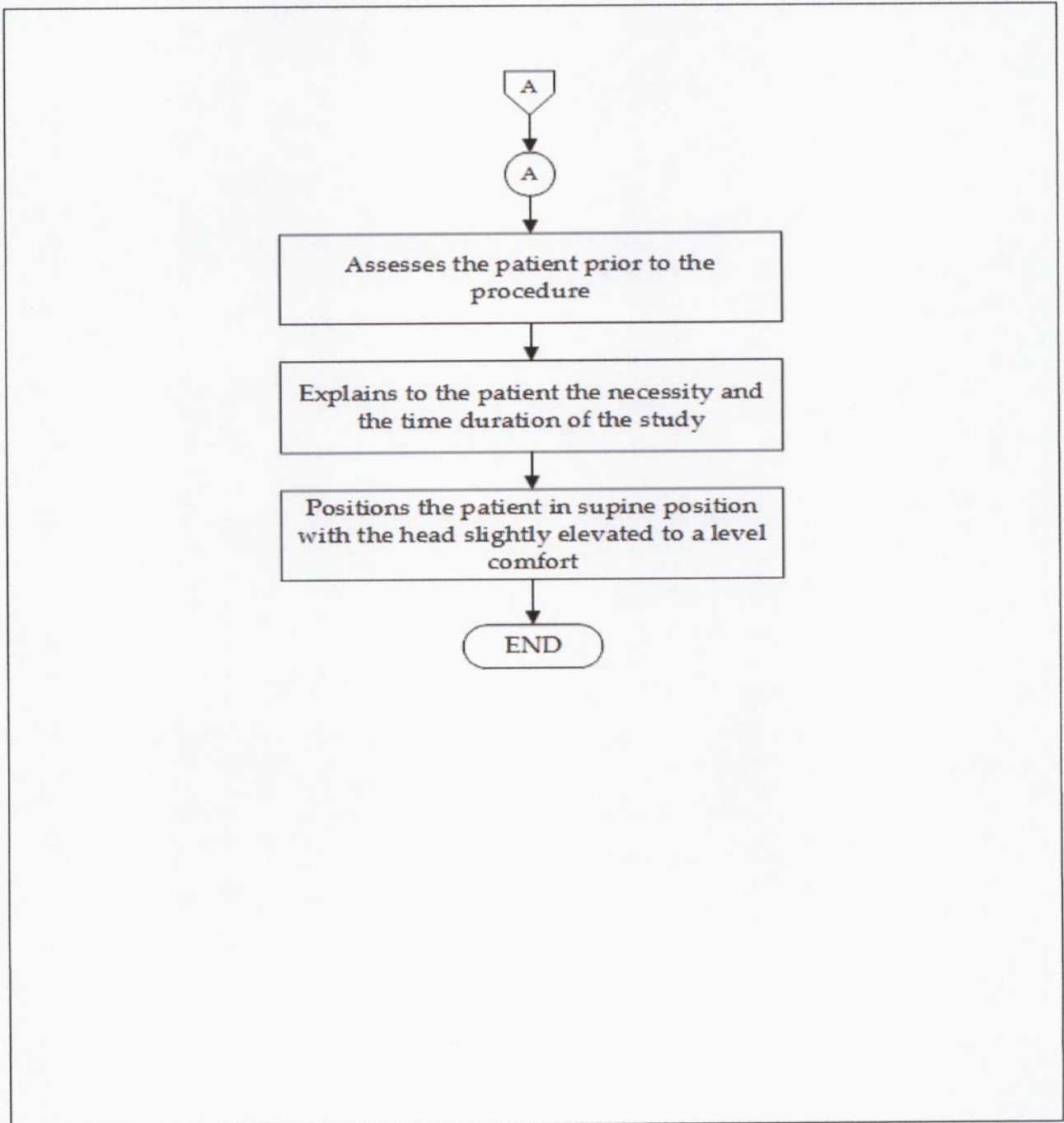




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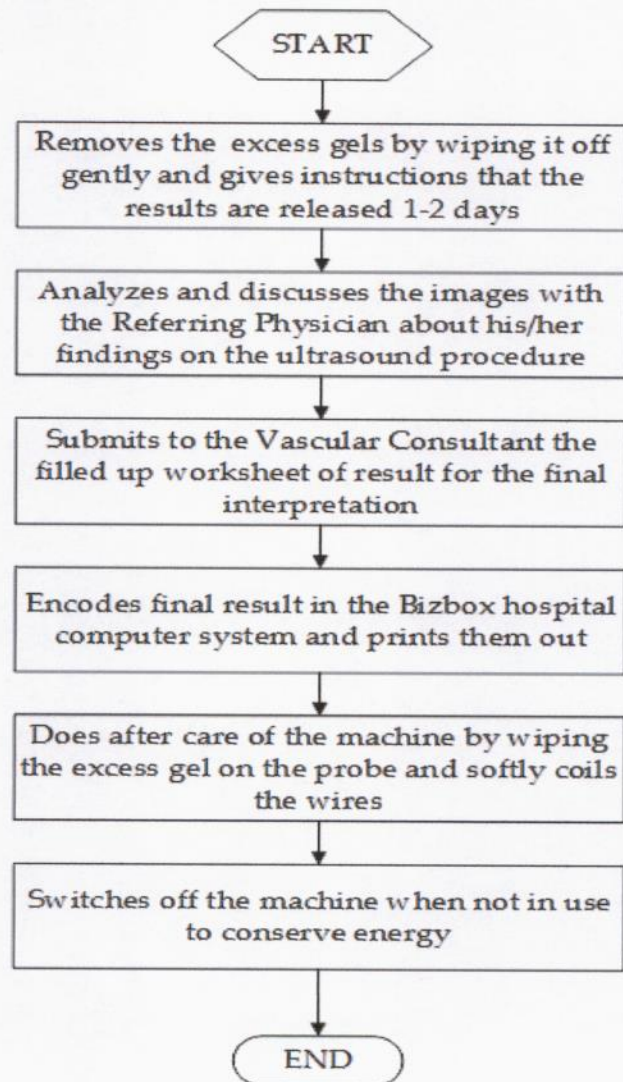



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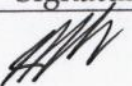
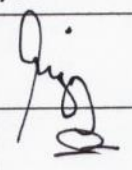
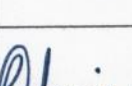

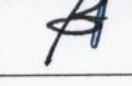
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## IN-PATIENT POST-EXAM PROCEDURE



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**APPROVAL:**

	Name/Title	Signature	Date
Prepared by:	<b>MA. LLANA LINDA A. CARDONES, RN</b> NICIS Supervisor		5/12/22
Verified:	<b>BONIFACIO C. SEPICO, RMT</b> Department of Imaging Sciences Manager		5/26/22
Reviewed by:	<b>DENNIS C. ESCALONA, MN, FPCHA, FPSQua</b> Quality Assurance Supervisor		06/30/2022
Recommending Approval:	<b>ROSARIO D. ABARING, MN, MBA-HA, PhD, FPCHA</b> Ancillary Services Division Officer	 	07.01.2022
	<b>HENRY F. ALAVAREN, MD, FPSMID, FPSQua</b> Total Quality Division Officer		7/7/22
Approved:	<b>GENESIS GOLDI D. GOLINGAN</b> President and CEO		