MR Elastography – Numaris X Job Aid

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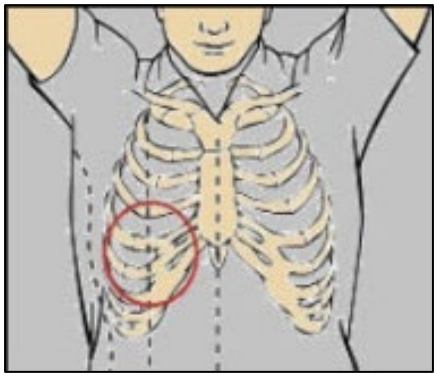
Elastography can be performed at the beginning or end of a routine liver examination, depending on the facility's preference. The patient should be NPO 4-6 hours prior to the exam.

1. **Active Driver (Located in Equipment Room)**
    a. **Active Driver > Turn On** – black rocker switch, back of unit
        i. **Numaris XA30-XA31 MR Systems**– if Active Driver is Turned-On it Wakes-up automatically as soon as an MRE Exam is started
            - **Access-i Router** (Optional Purchase) *must* be installed for Auto Wakeup to occur. If *not* purchased it behaves like Numaris XA20 Systems
        ii. **Numaris XA20 MR Systems** – if Active Driver is Turned-On it goes into Sleep Mode after approximately 1 hour of inactivity
            - **Power Cycle** – Turn Active Driver Off/On again to Wake-up

2. **Position Patient for Abdomen Examination**
    a. **Position Patient > Head-First > Supine**
    b. Place **Black Velcro Band** on **Patient Table** > **Position Middle of Liver**

3. **Position Paddle (Passive Driver) on Patients Upper-Right Abdomen**
    a. **Passive Driver Paddle Tubing –** position tubing through back of magnet along magnet tunnel (or front, depends on scan room configuration)
    b. **Attach Tubing to Passive Driver Paddle**
    c. **Position 1/3 of Paddle above level of Xyphoid on Patients Right Lateral Rib Cage**
    d. **Secure Paddle using Black Velcro Band** (e.g., Belt should be as tight as possible without causing discomfort or breathing difficulty)



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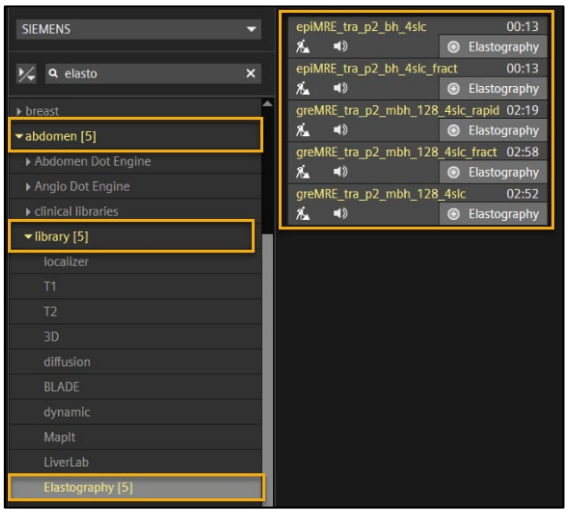
4. **Explain Breathing Instructions to Patient**
    a. Elastography is performed **End Expiration**
    b. Notify patient they will feel vibration coming from the paddle.

5. **Position Coil (e.g., Body Array/Body Matrix Body 12 or 18) on patient**

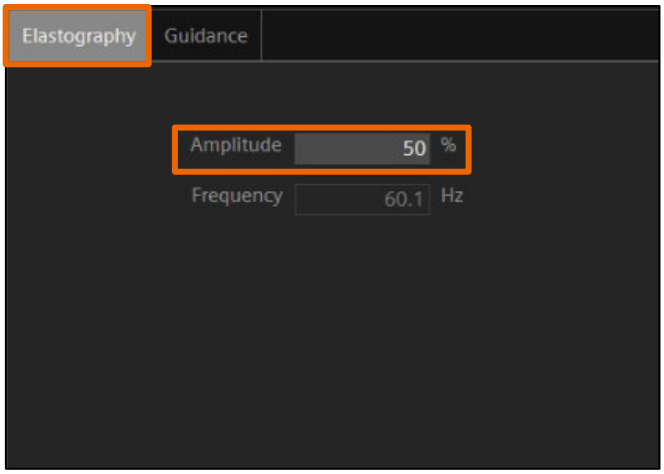
6. **Register Patient for Exam (e.g., MR Abdomen Dot, MR Elastography)**

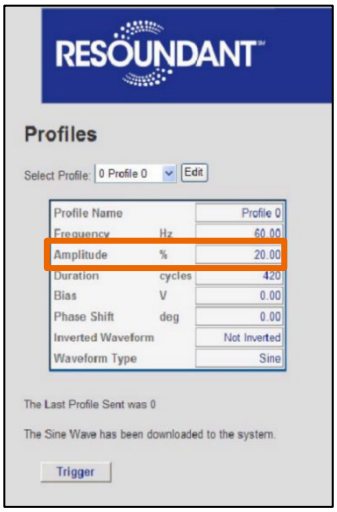
7. **Dot Cockpit**
    a. **Default > Default Add-ins > Elastography**
        i. New Add-in was added to Elastography protocols (≥XA30 software) with the purchase of the Access-i Router
            - **Access-i Router** (Optional Purchase) *must* be installed for access to the Add-in and Auto Wakeup to occur. If *not* purchased the Add-in isn't available.

8. **MR Elastography Protocols** (e.g., XA30 and XA31)
    a. **Abdomen > Library > Elastography** (e.g., protocols vary depending on software level).
        i. **greMRE** – Original standard MRE
        ii. **ep2d_se_MRE** – based on Single-shot SE Echo Planar Imaging (EPI)
            - Multiple slices in a single breath-hold
            - More robust against signal dephasing effects, especially at 3T
        iii. **Rapid MRE (greMRE *only*)**
            - Reduces acquisition and breath-hold times
            - Rapid MRE is activated by reducing TR time
        iv. **Fractional MRE (greMRE and ep2d_se_mre)**
            - *Only* for patients with short T2* relaxation times whose resulting liver signal is too low
            - Fractional MRE (fixed 65%) is automatically activated by reducing TE time to a minimum value (range below gray area, as shown below)



9. **Exam UI> Patient View > Elastography**
    a. **Amplitude** – Adjust Driver Amplitude depending on patient's size (default value of 40-50% should work in most circumstances)
        i. **Systems *with* Access-i Router (Optional Purchase)** – *with* Elastography Add-in, when Amplitude is adjusted the Driver is also updated
            - **Important Note** – **Access-i Router option** is *only* available for **XA30/XA31** systems
            - **Important Note** – **Resoundant Profile Amplitude adjustment** is *only* available if **network access to the driver *can be* enabled**
        ii. **Systems *without* Access-i Router** – when the Amplitude needs adjusted the Driver *must be* adjusted on the Resoundant Active Driver page.
            - **Important Note** – **Resoundant Profile Amplitude adjustment** is *only* available if **network access to the driver *can be* enabled**

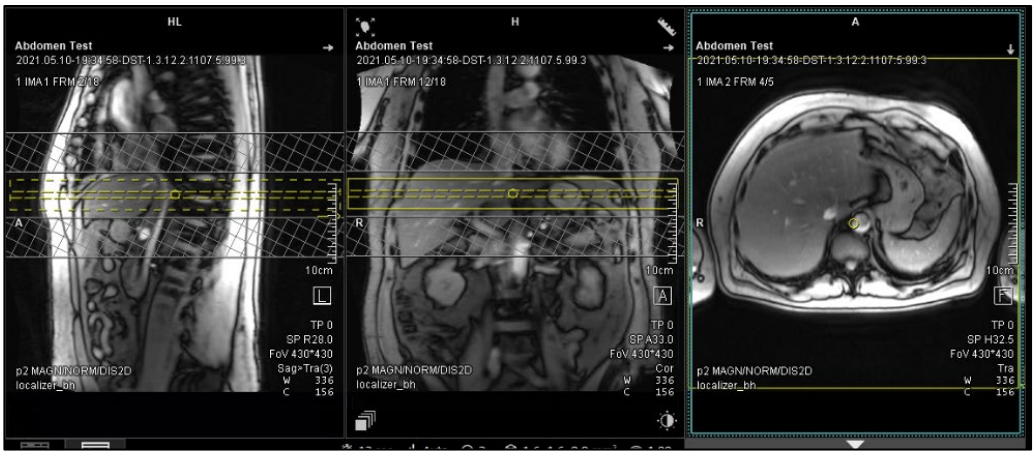




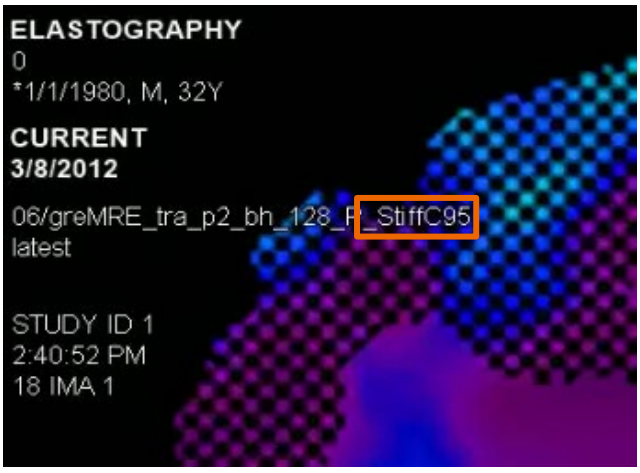
10. **Exam UI > Patient View > Guidance** – Passive Driver and Slice positioning Guidance
    a. **Passive Driver Position**
        i. Typically placed along right midclavicular line at the level of the xiphoid
    b. **Slice Position**
        i. Plan Slices through center of liver at end expiration

11. **Run Localizer**
    a. **Breath hold Command** > **End Expiration**

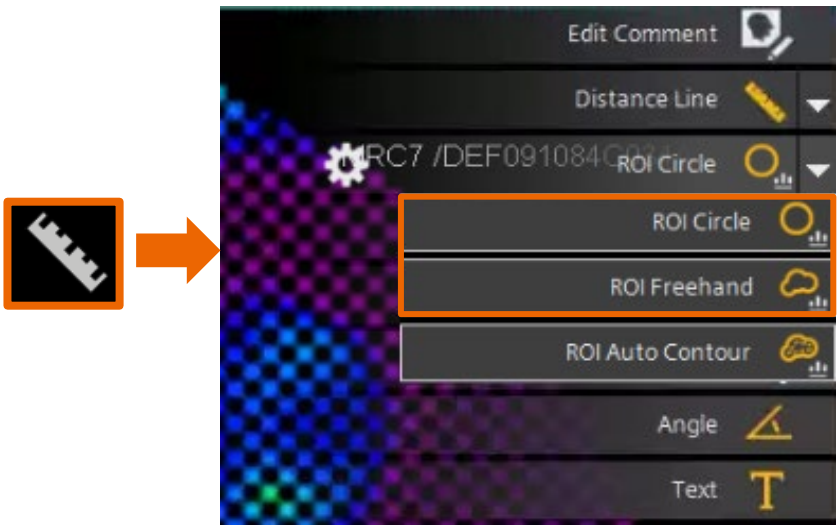
12. **MR Elastography Sequence**
    a. **Position Slices – Mid Liver**
    b. **Patient Instructions**
        i. **Paddle vibration will be felt again**
        ii. **Breath-hold Command > End Expiration**
    c. Select **GO** – runs sequence



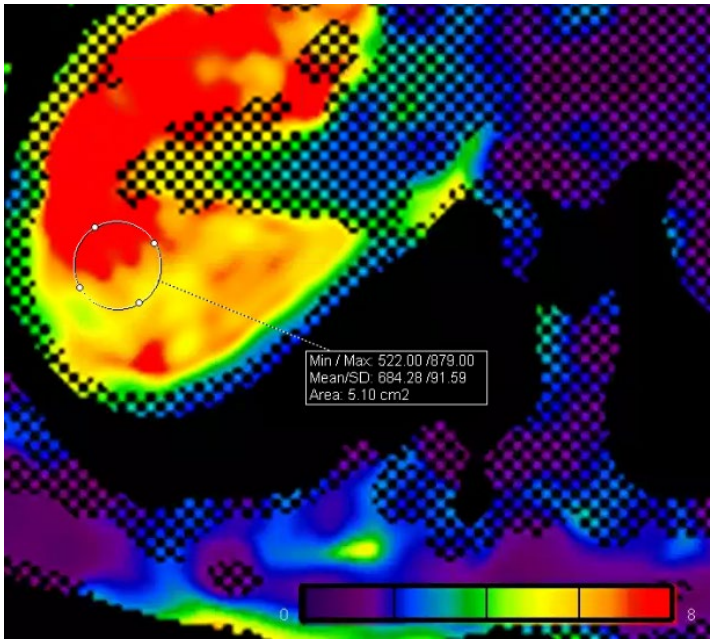
13. **Elastography Post-Processing**
    a. **Open Patient Browser**
        i. Select **Patient Study >** select **View&GO Icon**
    b. **MR View&GO**
        i. Locate **Stiffness 95% Map**
            - Displayed as "**_StiffC95"** Upper-Left Corner
            - **Hint**: Series consists of **Stiffness Map with a Grid Pattern** overlaid



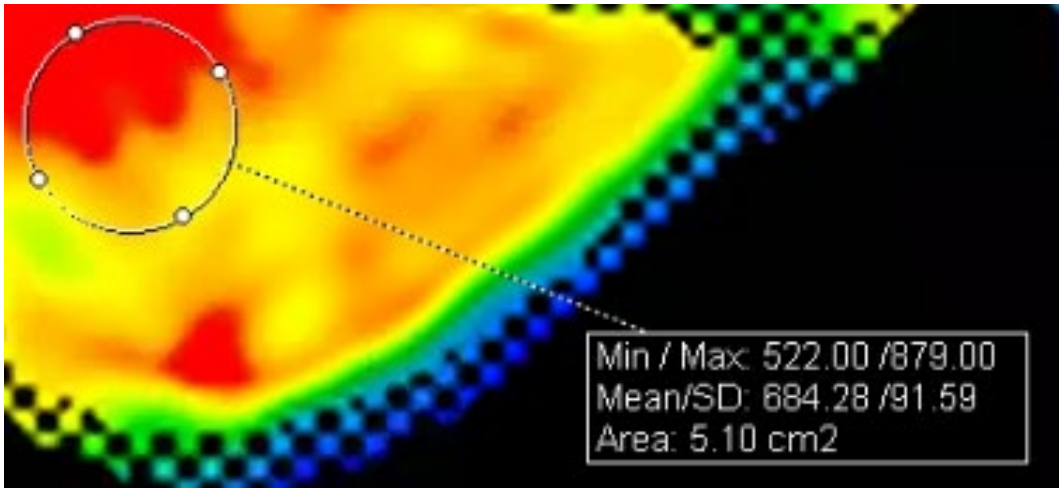
c. Select **Free-hand ROI or Circle ROI – Upper-Right-Corner**
   i. **Free-hand ROI Preferred** to include as much of the Liver area as possible
      - Alternately multiple circular ROIs *can* be used
   ii. Reported measurement is an average of all ROIs drawn over all slices acquired



d. **Draw ROI in Liver Tissue *Only***
   i. **Caution**: *Don't draw* Free-hand *ROI* or Circle ROI in Grid Area
      - e.g., don't include any of the Grid as it will corrupt the measurement



e. **Stiffness in Kilopascals (kPa) = Mean Value divided by 100**
    i. **Example: 684.28/100 = 6.84 kPa**



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