Pulmonary Diagnostics: Spirometry Using the Vyntus SPIRO

Site Applicability

St. Paul's Hospital
Mount Saint Joseph Hospital

Practice Level

Respiratory Therapist

Need to Know

Spirometry is a physiological test that measures the maximal volume of air an individual can inspire and expire with maximal effort.

At PHC, spirometry is considered an aerosol generating procedure (AGMP). A point of care risk assessment should be conducted prior to testing and current IPAC policies/procedures should be adhered to.

Patients with significant musculoskeletal disorders (kyphosis, scoliosis, etc.) may be required to use arm span in place of measured standing height.

Patients with restrictive lung disease and young patients with high elastic recoil can empty their lungs quickly and may not be able to hold an expiratory plateau for 1 second.

A translator or virtual translation service should be used during testing if a language barrier is identified between the patient and clinician.

Indications:

To determine the presence or absence of lung disease

To measure the severity of disease on lung function

To measure the effects of occupational or environmental exposure

To assess response to therapeutic intervention

To assess preoperative risk

To evaluate the level of disability or impairment

To continue the advancement of research

Absolute/Relative Contraindications:

Hemoptysis of unknown origin

Pneumothorax

Unstable cardiovascular status

Thoracic, abdominal, or cerebral aneurysm

Recent thoracic, abdominal, brain, ocular, or middle ear surgery

Acute nausea or vomiting

Active or suspected transmissible respiratory or systemic infection (ie. Tuberculosis)

Cautions

Patients should be observed for dizziness or signs of syncope and testing stopped accordingly.

Equipment and Supplies

Vyntus SPIRO Portable Spirometer with SentrySuite Enabled Laptop

MicroGard Bacterial/Viral Filter

Hard Plastic or Silicone Mouthpiece (optional)

Nose Clip

Portable Pulse Oximeter

Procedure

Patient Preparation:

1. The patient should:
    a. refrain from smoking/vaping within 1 hour of testing
    b. refrain from eating a large meal prior to testing
    c. refrain from exercise/physical exertion prior to testing
    d. wear loose, comfortable clothing
    e. withhold certain respiratory medications (bronchodilators) if possible. If unable to do so for medical reasons, the RT should document date/time respiratory medications were taken in the spirometry report comments.
    f. sit upright
2. Patients will have to remove supplemental oxygen for testing and should be assessed for their ability to tolerate this prior to testing.
3. RT should assess the patient's physical and mental ability to undergo testing.

Steps

1. Launch SentrySuite application from desktop. Ensure a valid calibration has been completed and ambient conditions are correct.
2. From the SentrySuite desktop, select “patient”. Using the “identification” field, enter PHN to verify if a patient profile already exists.
3. For new patients, select “new patient” icon from bottom left-hand corner of screen. Enter patient information accurately as follows:
    a. Identification: PHN
    b. Last name: All capital letters (e.g. SMITH)
    c. First name: First letter capitalized (e.g. John)
    d. DOB: mm/dd/yyyy
    e. Gender: M or F. NOTE: for transgender patients, please use gender assigned at birth
    f. Height: cm; round to nearest 0.5
    g. Weight: kg; whole numbers only
    h. Race: Caucasian, SEAsian, NEAsian, or Black. *Refer to ethic grouping resource
    i. Smoking History: smoking status (current, casual, ex-smoker, # of pack years, quit date)

    obtain history of recent bronchodilator use, recent smoking/vaping etc. as well
4. Click “save”. From SentrySuite desktop select “measurement”.
5. A “zero adjustment” window will automatically appear. Follow prompts and click “OK”.
6. The patient should be seated comfortably with both feet flat on the floor. Record oxygen saturation and explain procedure to patient.
7. Affix MicroGard filter and mouthpiece to spirometer handle. Select “F1” to begin measurement. Confirm there is no drift on the volume/time graph prior to handing patient spirometer handle.
8. Place nose clips securely on patients’ nose and ask them to place the mouthpiece in their mouth forming a tight seal.
9. Instruct the patient to relax and breathe normally, in and out through their mouth
10. Once stable baseline is established, instruct the patient to take a large breath in fully, and without hesitation, exhale forcefully and maximally, then quickly inhale maximally
11. Select “F3” to stop maneuver. Review trial results and provide patient with feedback/encouragement as required.
12. Repeat steps 7 to 11 for each effort. A minimum of 3 acceptable maneuvers are required to meet ATS criteria (maximum of 8)
13. Repeatability of trials is achieved when the difference between the two best FVCs and FEV1s is equal to or less than 0.15L and BEV equal to or less than 0.1 L or 5% of FVC (whichever is greater). Failure to meet this criteria should be noted in the report comments.

14. Report the trial with the largest combined value of FVC and FEV1 from acceptable maneuvers.
15. To complete post bronchodilator spirometry:
    a. Administer 4 puffs of salbutamol via MDI + spacer. As an alternative to salbutamol, 2 puffs of ipratropium bromide may be used instead. Wait 10 minutes before proceeding with testing (wait 15 minutes if using ipratropium bromide).
    b. Using the drop down option located on the right-hand side of the "forced spirometry" button, select "New Post"
    c. Perform spirometry as per steps 7 to 14 listed above.
16. To generate report print out: select "provi1_spiro" report option. Review data and ensure information is correct.
17. Select "Templates" from bottom right-hand corner of screen. Click on "PFT" folder and select applicable report comments. Ensure resting SpO_2 is documented.
18. Print two copies of spirometry report:
    a. Place one copy in the "diagnostics" section of the patient's chartlet and write "DO NOT SCAN" legibly on the report.
    b. Print a Cerner patient form label, affix to top right-hand corner of report, and place in the wall folder marked "Pulmonary Function Tests" in the 8B report room.

Documentation

Document the spirometry testing in the 'documentation" section of CST PowerChart. Comment on patient effort, cooperation, compliance with ATS criteria, and where a physical copy of the preliminary test results can be found.

Related Documents

B-00-12-12141 - Calibration of Vyntus SPIRO Procedure Document

References

American Thoracic Society Documents. *Standardization of Spirometry 2019 Update. An Official American Thoracic Society and European Respiratory Society Technical Statement. Brian L. Graham et. al. September 2019.*

Vyaire Medical Instructions for Use Vyntus SPIRO Manual. V-781351-320 Version 01.00 for SentrySuite Software 3.20.

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