Intra-Operative Thoracoscopic Assisting Techniques

S. Scott Balderson PA-C
Clinical Instructor, Duke Surgical Physician Assistant Residency
Division of Thoracic Surgery
Thoracic Oncology Program
Duke Comprehensive Cancer Center
Duke University Medical Center
Durham, NC
Disclosures

- Covidien Consultant
- W.L. Gore Consultant
AKA: How to Help Your Surgeon Overcome The Learning Curve

- Barriers to Adoption
  - Qualified Assistance
  - Specific Equipment
  - Specific Instruments
Objectives

- Thoracoscopic Case Preparation
  - Team, Equipment and Instruments, Positioning
  - Equipment
  - Instruments
  - Positioning

- Thoracoscopic Assisting Techniques
  - The Camera Pilot
  - Tricks of the trade
  - helpful thoracoscopic assisting maneuvers
Basic Concepts in VATS

- Best results with a dedicated team
- Visualization is an important key to success
  - Difficult angles
  - Multiple instruments through the same incision
  - High rent district
Basic Concepts in VATS

- No insufflation needed
  - Ribs maintain the workspace once the lung is collapsed

- No ports needed
  - Only one port is usually used for the camera
  - Allows multiple instruments per incision

- Incision Placement is critical
  - Ribs limit motion of the camera
    - Too much torque on ribs will cause post-op neuropathic pain
The Thoracoscopic Lobectomy Team

- **Surgeon**
- **Camera Pilot**
  - Goal is seamless view with minimal communication and correction by the surgeon
- **Scrub tech**
  - Should know the instruments and backup plans (sponge stick)
  - Should aspire to familiarize with the intended steps and common maneuvers of the procedure
    - Sxn-dissecting clamp-sxn-stapler
- **Circulator**
  - Should know the types of staple loads used and where to find them quickly
  - Support Personnel who are familiar with ordering procedures
Building a Team

- Consistency
  - Consistent assistants are more important than the level of training
    - Partner, Resident, Physician Assistant, Nurse, Scrub Tech
  - However, the higher the level of training and/or experience, the better the procedural insight, understanding of thoracic anatomy, etc.
  - Ex. Understanding the difference between a PTX vs Tension PTX
Building a Team

Communication

- Clarify the names of instruments
  - Often local names
    - “long curved empty”
    - “Scanlan clamp”
- Clarity is essential among Surgeon, Scrub, Circulator and First Assist (Camera Pilot)
- Over time the surgeon and camera pilot should develop a language that quickly and efficiently communicates the needs of the surgeon
  - “The Sterile Cockpit”
The First Assistant = Camera Pilot

- What to look for in a Camera Pilot
  - Interest in minimally invasive surgery
    - Passion, patience, reverence (root word of passion is...)
  - Experience in thoracic surgery
  - Willingness to learn thoracoscopic anatomy
    - (hilar perspective as opposed to “fissure” perspective)
  - Knowledge of instrumentation
  - Knowledge of equipment
  - A resonant appreciation for the technical contribution to the case

- Of the above only Interest is mandatory the rest can be learned and developed
Camera Pilot

- Poor Camera operation can make for a painfully long case
  - When the scope has to be removed to be cleaned
  - When the pilot has difficulty reintroducing the scope into a complex hemithorax
  - Smudge
  - Reproducing the a consistent view in scope angle and horizon

- Poor Camera operation can impact the safety of a case
  - If the surgeon cannot visualize……
Camera Operations

- Camera Pilot needs a working knowledge of the function of the camera/scope/monitors
  - Proper use of 30 degree, flexible tip or other scope optimizes the surgeon’s view
  - In the HD world it is VERY IMPORTANT to understand how the technology functions and what the technological implications are for the surgeon.
    - Ex. Low light = grainy picture = loss of resolution = loss of ability to visualize planes...
  - Helpful in troubleshooting
Camera Operations

- Camera Pilot should understand the steps for the intended procedure
  - Allows anticipation of the surgeon’s next move
- The camera view is very much a dance, the surgeon must be allowed to move within the frame as opposed to being led.
  - The pilot must know (or ask) what should be in the center of the screen (instrument, structure etc)
- Goal is for the only perception of movement on the monitor to be the maneuvers of the surgeon
- The Pilot must come to appreciate the value
Thoracoscopic Equipment
Thoracoscopic Equipment
Thoracoscopic Equipment - Storz
Thoracoscopic Equipment - Storz
**Thoracoscope - Design**

- ALL Thoracoscopes are VERY fragile.
- 10lbs of force will break a 10mm scope
  - The weight of the camera alone can damage the outside casing
  - A dent in the casing means that light fibers can be broken.
  - Think of the times where you THINK the scope is in focus but it is not in certain areas of the field.
- 3lbs of force will snap a 5 mm scope
  - Will bow 20 degrees before resistance can be detected
Thoracoscope Design
Thoracoscopic Equipment - Olympus
Thoracoscopic Equipment - Olympus
Thoracoscopic Equipment - Olympus
Beware Scope Damage
Determining the damaged scope
Chipped Distal Lens
Broken Light Fibers
Rod Lens No Longer Lines Up
Anti-Smudge Products - Floshield
Thoracoscopic Instruments
Thoracoscopic Instruments
Thoracoscopic Instruments - Scanlan
Thoracoscopic Instruments
Thoracoscopic Instruments
Thoracoscopic Instruments - Wexler
Thoracoscopic Instruments - Covidien
Thoracoscopic Instruments - Covidien
Thoracoscopic Instruments - Ethicon
Patient positioning - Bean Bag
**Patient Positioning**

- **Standard lateral decubitis position**
  - Flex the bed
    - Helps keep the camera from hitting the hip which limits camera angles
  - Slightly posteriorly rotated
    - Makes the anterior incision a little easier to access
Patient Positioning - Bean Bag
Patient Positioning - Secure Strap Location (Anterior)
Patient Positioning - Stability Posterior
Patient Positioning - Secure to Table
Patient Positioning - Table Break (flex)
Patient Positioning - Axilla and Securing Arms
Patient Positioning - Axilla
Incisions

- Two incisions will allow almost any operation
  - 10 mm camera port
    - 7th or 8th intercostal space, posterior axillary line
  - 3-4 cm anterior access incision
    - 4th or 5th intercostal space, anterior axillary line
Patient Positioning - Marking Incision
Putting it all together to start a case

- Consistent approach is an operative strategy
- Use of a consistent patient position and incisions provides consistent exposure for the surgeon
- Consistent exposure, regardless of the planned anatomic resection, provides the surgeon a familiar field to develop consistent maneuvers
- Beware the theory of triangulation etc.
- Predictable and Consistent angles of approach and retraction are key to a successful procedure
Part 2

- Tricks
Camera Operations

- There must be a clear method of communicating the visual (exposure) needs of the surgeon as:
  - The pilot has three perspectives to maintain: the focal length, camera head rotation and the scope angle.
**Camera Operations**

- **Focal Length**
- **A depth of field must be developed**
  - Facilitates depth perception
  - Close but not too close
    - If too close, the camera can affect the instrument angles available to the surgeon
    - A tight focal length can be helpful during delicate dissection but hurtful for frame of reference
  - **Anticipate when to pan in and out**
    - Understanding the action being performed
      - Adjusting retraction vs. fine dissection on the artery
Focal length - loss of reference
Focal Length – reference (the power of panning out 2cm!!)
Camera head rotation controls:

Horizon

- Refers to the structure on which the camera view is based.
Camera Operations

– Third control is the barrel of the light cord which controls the scope angle (exception: Olympus)

– Clock face
  • Refers to the barrel of the light cord on the scope relative to the position of the hour hand on a clock
  • Functionally, this reference can allow the surgeon to request a different angle without having to reach across to adjust the scope angle.
Camera Operations

- Together the focal length, horizon and scope angle facilitate visual feedback to create as close to a three dimensional view as possible

- Optimizing these controls also minimize the incidence of intercostal nerve irritation
  - Beware intercostal compression injury
  - 10mm vs 5mm scope – fragility
Duke beats UNC!!!