Commentary: Droopy kidneys and floppy airways: Keeping taut standards with surgical innovation

Sidhu P. Gangadharan, MD, MHCM

PII: S0022-5223(22)01041-8
DOI: https://doi.org/10.1016/j.jtcvs.2022.09.050
Reference: YMTC 18791

To appear in: The Journal of Thoracic and Cardiovascular Surgery

Received Date: 7 September 2022
Revised Date: 22 September 2022
Accepted Date: 26 September 2022

Please cite this article as: Gangadharan SP, Commentary: Droopy kidneys and floppy airways: Keeping taut standards with surgical innovation, The Journal of Thoracic and Cardiovascular Surgery (2022), doi: https://doi.org/10.1016/j.jtcvs.2022.09.050.

This is a PDF file of an article that has undergone enhancements after acceptance, such as the addition of a cover page and metadata, and formatting for readability, but it is not yet the definitive version of record. This version will undergo additional copyediting, typesetting and review before it is published in its final form, but we are providing this version to give early visibility of the article. Please note that, during the production process, errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Copyright © 2022 Published by Elsevier Inc. on behalf of The American Association for Thoracic Surgery
Commentary: Droopy kidneys and floppy airways: Keeping taut standards with surgical innovation

Sidhu P. Gangadharan, MD, MHCM
Division of Thoracic Surgery and Interventional Pulmonology, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA

Word Count: 536

Disclosures: No disclosures to report

Corresponding Author:

Sidhu P. Gangadharan, MD, MHCM, Division of Thoracic Surgery and Interventional Pulmonology, Beth Israel Deaconess Medical Center, 185 Pilgrim Rd, W/DC 201, Boston, MA, 02215 (email: sgangadh@bidmc.harvard.edu)
Central Message: Robotic tracheobronchoplasty is an excellent technique for surgical stabilization for patients with tracheobronchomalacia, but still requires high standards for patient selection and measurement of outcomes.

Central Picture Legend: Potential pitfalls in assuming that surgical anatomic correction leads to symptom relief.

In the early 1900s, patients with abdominal pain began to be diagnosed with a condition known as nephroptosis. Before long, nearly 170 operations had been devised to reposition and stabilize the ‘movable kidney’. However, within a span of about 30 years, surgical procedures to fix nephroptosis peaked and then disappeared. Surgical history is littered with such operations with plausible anatomic rationale, but lack of efficacy because the purported causal mechanism suffered from various logical fallacies (see Central Picture).

In their retrospective series, Inra and colleagues demonstrate that both pulmonary function and quality of life improve after undergoing robotic tracheobronchoplasty (R-TBP). This group’s development and refinement of this highly complex, minimally-invasive operation deserves the highest accolades. In just eight years, 118 patients judged by dynamic bronchoscopy to have luminal collapse >90% underwent R-TBP. The 108 patients with pre- and post-operative PFTs demonstrated a significant increase in percent predicted FEV1 from 77% to 83%. Sixty-four
patients showed significant improvement of St George Respiratory Questionnaire (SGRQ) scores from a median of 61 to 42.

Unfortunately these limited results leave R-TBP susceptible to the flaws in reasoning that have plagued other operations designed to improve quality of life. Is FEV1 important or not? Prior studies suggest that it might not be.\textsuperscript{3,4} In this paper, the least severe GOLD 1 class (FEV1 ≥ 80\%) accounts for nearly 50\% of the patients, and their FEV1 did not improve. SGRQ cannot complete the story, since only 54\% of patients had SQRQ measured. The reported severity of SGRQ also raises questions, with GOLD 1 patients not only having worse (higher) SGRQ scores than the GOLD 2 patients, but having much worse scores than typical GOLD 1 patients in the literature.\textsuperscript{5} Additional metrics such as 6-minute walk duration, Cough Quality of Life Questionnaire, and Modified Medical Research Council Dyspnea Scale should have been measured to ensure a thorough assessment.

Finally, how do we more reliably establish the link between anatomy and symptoms? Our center uses temporary airway stabilization with stents to answer this question: if the symptoms and functional status improve with stents, then there is one less leap of faith to make and one less fallacy potentially to commit.\textsuperscript{6}
References


If **P**

THERE ARE SYMPTOMS → THERE IS SUBOPTIMAL ANATOMY → SURGERY IS DONE

**POST HOC ERGO PROPTER HOC**

then **Q**

ANATOMY IS OPTIMIZED → SYMPTOMS ARE IMPROVED

**WRONG DIRECTION FALLACY**

**THIRD CAUSE FALLACY**

COMPONENTS:
- BEHAVIOR CHANGE
- PLACEBO EFFECT
- UNMEASURED FACTORS
- INADVERTENT ANATOMIC CHANGE
- ADJUNCTIVE TREATMENT
If \( P \):
- There are symptoms
- There is suboptimal anatomy
- Surgery is done

Then \( Q \):
- Anomaly is optimized
- Symptoms are improved

**Post Hoc Ergo Propter Hoc**

**Wrong Direction Fallacy**

**Third Cause Fallacy**