Editorial

Sternotomy for management of myasthenia gravis: is the time to retire?

Alfonso Fiorelli[1], Francesco Paolo Caronia[2], Immacolata Mauro[3], Giuseppe Di Miceli[2], Mario Santini[1]

[1]Thoracic Surgery Unit, Università della Campania Luigi Vanvitelli, Naples, Italy; [2]Thoracic Surgery Unit, Ospedale Civico di Palermo, Palermo, Italy; [3]Pneumology Unit, Ospedale Mauro Scarlato, Scafati, Italy

Correspondence to: Alfonso Fiorelli, MD, PhD. Thoracic Surgery Unit, Università della Campania Luigi Vanvitelli, Piazza Miraglia 2, I-80138 Naples, Italy. Email: alfonso.fiorelli@unicampania.it.

Comment on: Shiomi K, Kitamura E, Ono M, *et al.* Feasible and promising modified trans-subxiphoid thoracoscopic extended thymectomy for patients with myasthenia gravis. J Thorac Dis 2018;10:1747-52.

Received: 05 July 2018; Accepted: 19 September 2018; Published: 12 October 2018.

doi: 10.21037/med.2018.09.02

View this article at: http://dx.doi.org/10.21037/med.2018.09.02

Surgical resection is the main treatment for myasthenia gravis (MG) associated with thymic hyperplasia or thymoma. The first thymectomy was performed in 1939 using full median sternotomy, but the morbidity and mortality related to sternotomy let surgeons to explore in selected cases less invasive approaches including transcervical or partial sternotomy (1-4). With the growing experience in minimally invasive surgery and the improvement of surgical instruments, in 1994 Novellino *et al.* (5) performed the first video-assisted thoracoscopy extended thymectomy (VATET). After that, the adoption of VATET growed among thoracic surgeons who reported in selected cases the same clinical outcomes of sternotomy but better post-operative and cosmetic results (6-10). Over the years, the indication of VATET was then extended to include also myasthenic patients with small thymoma (Masaoka stage I or stage II) by performing additional surgical incisions at level of the sternum (11), of the anterior chest wall (12), and of subxifoid region (13) to improve the endoscopic view and to facilitate the resection of the thymoma and mediastinal fatty. Furthermore, uniportal instead of multi ports VATET was also used to further reduce the surgical trauma and improve the cosmetic results (14-16).

In line with this tendency, Shiomi *et al.* (17) modified the single-port subxiphoid approach proposed by Suda *et al.* (18,19) by an additional 5-mm port performed on the right side of the chest to improve the access to the bilateral phrenic nerves and the upper area of the innominate vein. They used the modified single-port trans-subxiphoid approach (MTXA) in 10 myasthenic patients with thymic hyperplasia and in three myasthenic patients with thymoma and retrospectively compared the post-operative and clinical results with those of myasthenic patients with thymic hyperplasia (n=6) or thymoma (n=14) operated in the same period using standard sternotomy. MTXA compared to sternotomy offered similar clinical outcome but a significant reduction of blood loss (P<0.001); length of hospital stay (P=0.004); CRP in post-operative day 1 (P=0.0073). Despite these results are in line with other studies (6-13) and reviews (20,21), however they should be considered with cautious for the following limitations: (I) the retrospective nature of the study and the lack of a propensity match analysis due to the small number of patients make the two study groups not comparable. The sternotomy group presented a higher incidence of thymoma; thus, the surgical maneuvers to resect thymoma rather than the different surgical incision could explain the different post-operative out-come; (II) in theory, the reduction of length of incisions related to MTXA could be associated with less post-operative pain and better cosmetic results compared to sternotomy. However, no variables (i.e., post-operative pain, consumption of analgesic etc.) to support this hypothesis were evaluated; (III) Jaretzki *et al.* (22) reported that the amount of tissue resected is the most objective parameter for estimation of surgical effect in the management of MG. However, the weight of specimens was not reported, making difficult to define whether the amount of the thymus and surrounding tissue resected in MTXA group was equivalent to that in sternotomy group;

(IV) in a meta-analysis including 15 studies and involving 1,003 MG patients, Ng *et al.* (23) compared VATS (n=533), transcervical (n=449), and infrasternal mediastinoscopic (n=21) procedures and found that VATS and transcervical surgery had comparable remission rates at the 10-year follow-up (35.4% *vs.* 38.1%, respectively). However, the short follow-up did not allow to draw definitive conclusions on the clinical outcome of this technique, since thymoma is an indolent tumor that can recur 5–10 years after resection.

Finally, the authors should be commended for their work that additionally confirmed the general impression that in selected myasthenic patients a minimally invasive approach could be equivalent to sternotomy in terms of clinical outcome but with the advantages of better post-operative outcomes and cosmetic results. However, the selection of patient remains mandatory for the appropriate choice of the surgical approach, taking in mind that the obtaining good cosmetic results should not reduce the ability to achieve radical resection of thymic tissue, the primary objective of surgery. Thus, future prospective randomized trials are wanted to clarify whether it is the time to retire for sternotomy.

Acknowledgments

Funding: None.

Footnote

Provenance and Peer Review: This article was commissioned and reviewed by Section Editor Dr. Zhuoqi Jia (Department of Thoracic, The First Affiliated Hospital of Xi'an Jiaotong University, Xi'an, China).

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at http://dx.doi.org/10.21037/med.2018.09.02). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

References

1. Blalock A, Mason MF, Morgan HJ, et al. Myasthenia gravis and tumors of the thymic region: report of a case in which the tumor was removed. Ann Surg 1939;110:544-61.
2. Kark AE, Kirschner PA. Total thymectomy by the transcervical approach. Br J Surg 1971;58:321-6.
3. Miller JI, Mansour KA, Hatcher CR Jr. Median sternotomy T incision for thymectomy in myasthenia gravis. Ann Thorac Surg 1982;34:473-4.
4. Cooper JD, Al-Jilaihawa AN, Pearson FG, et al. An improved technique to facilitate transcervical thymectomy for myasthenia gravis. Ann Thorac Surg 1988;45:242-7.
5. Novellino L, Longoni M, Spinelli L, et al. "Extended" thymectomy, without sternotomy, performed by cervicotomy and thoracoscopic technique in the treatment of myasthenia gravis. Int Surg 1994;79:378-81.
6. Yuan ZY, Cheng GY, Sun KL, et al. Comparative study of video-assisted thoracic surgery vs. open thymectomy for thymoma in one single center. J Thorac Dis 2014;6:726-33.
7. Lo CM, Lu HI, Hsieh MJ, et al. Thymectomy for myasthenia gravis: video-assisted vs. transsternal. J Formos Med Assoc 2014;113:722-6.
8. Fiorelli A, Mazzella A, Cascone R, et al. Bilateral thoracoscopic extended thymectomy versus sternotomy. Asian Cardiovasc Thorac Ann 2016;24:555-61.
9. Xie X, Gan X, Chen B, et al. Left- and right-sided video assisted thoracoscopic thymectomy exhibit similar effects on myasthenia gravis. J Thorac Dis 2016;8:124-32.
10. Shiono H, Kadota Y, Hayashi A, et al. Comparison of outcomes after extended thymectomy for myasthenia gravis: bilateral thoracoscopic approach versus sternotomy. Surg Laparosc Endosc Percutan Tech 2009;19:424-7.
11. Caronia F, Fiorelli A, Monte AL. Bilateral thoracoscopic thymectomy using a novel positioning system. Asian Cardiovasc Thorac Ann 2014;22:1135-7
12. Ohta M, Hirabayasi H, Okumura M, et al . Thoracoscopic thymectomy using anterior chest wall lifting method. Ann Thorac Surg 2003;76:1310-11.
13. Hsu CP, Chuang CY, Hsu NY, et al. Subxiphoid approach for video-assisted thoracoscopic extended thymectomy in

treating myasthenia gravis. Interact Cardiovasc Thorac Surg 2002;1:4-8.
14. Caronia FP, Fiorelli A, Santini M, et al. Uniportal bilateral video-assisted thoracoscopic extended thymectomy for myasthenia gravis: A case report. J Thorac Cardiovasc Surg 2015;150:e1-3.
15. Caronia FP, Fiorelli A, Arrigo E, et al. Bilateral single-port thoracoscopic extended thymectomy for management of thymoma and myasthenia gravis: case report. J Cardiothorac Surg 2016;11:153.
16. Caronia FP, Arrigo E, Trovato S, et al. Uniportal bilateral video-assisted sequential thoracoscopic extended thymectomy. J Vis Surg 2017;3:69.
17. Shiomi K, Kitamura E, Ono M, et al. Feasible and promising modified trans-subxiphoid thoracoscopic extended thymectomy for patients with myasthenia gravis. J Thorac Dis 2018;10:1747-52.
18. Suda T, Kaneda S, Hachimaru A, et al. Thymectomy via a subxiphoid approach: single-port and robot-assisted. J Thorac Dis 2016;8:S265-71.
19. Suda T. Single-port thymectomy using subxiphoid approach-surgical technique. Ann Cardiothorac Surg 2016;5:56-8.
20. Zahid I, Sharif S, Routledge T, et al. Video assisted thoracoscopic surgery or transsternal thymectomy in the treatment of myasthenia gravis? Interact Cardiovasc Thorac Surg 2011;12:40-6.
21. Bagheri R, Boonstani R, Sadrizadeh A, et al. Thymectomy for Nonthymomatous Myasthenia Gravis: Comparison of Video-Assisted Thoracoscopic and Transsternal Thymectomy. Innovations (Phila) 2018;13:77-80.
22. Jaretzki A 3rd, Wolff M. "Maximal" thymectomy for myasthenia gravis. Surgical anatomy and operative technique. J Thorac Cardiovasc Surg 1988;96:711-6.
23. Ng CS, Wan IY, Yim AP. Video-assisted thoracic surgery thymectomy: the better approach. Ann Thorac Surg 2010;6:S2135-41.

doi: 10.21037/med.2018.09.02
Cite this article as: Fiorelli A, Caronia FP, Mauro I, Di Miceli G, Santini M. Sternotomy for management of myasthenia gravis: is the time to retire? Mediastinum 2018;2:56.

