Development in lung transplantation, organ shortage, Bronchiolitis Obliterans and overall survival in the US, 2011-2018

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Introduction & Objectives

Lung transplantation (LTx) outcome[1] [2] is poor in comparison to other solid organs. Our aim was to review the development in LTx-related procedures and organ availability, survival and leading chronic complications and associated cost in the United States. The time period considered is 2011 to 2018 for LTx.

Materials and Methods

The following parameters from OPTN/SRTR Annual Data Reports for Lung[345678910] were screened on an annual basis: number of lung transplants, patients on waiting-list at year-end, trend in 5-year bronchiolitis obliterans syndrome (BOS), and 5-year overall survival rate. Five-year rates were respectively calculated for a 3-year cluster period. Cost estimates were sourced from the Milliman Research Report 2020[11]. Estimates were based on U.S. average utilization, billed charges, and results per member per month cost. It comprised a 30-day pre- to 180-day post-transplant period, including pre-transplant, organ procurement, hospital transplant, physician during transplant admission, post-transplant discharge, outpatient immunosuppression, and other drugs.

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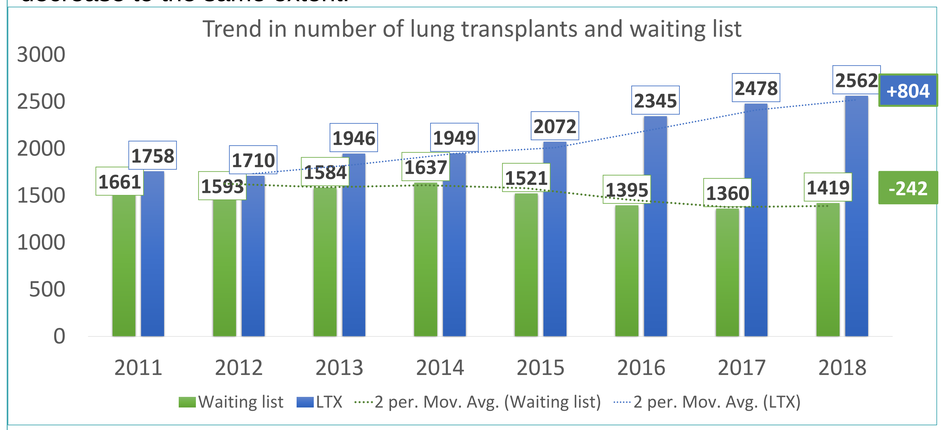
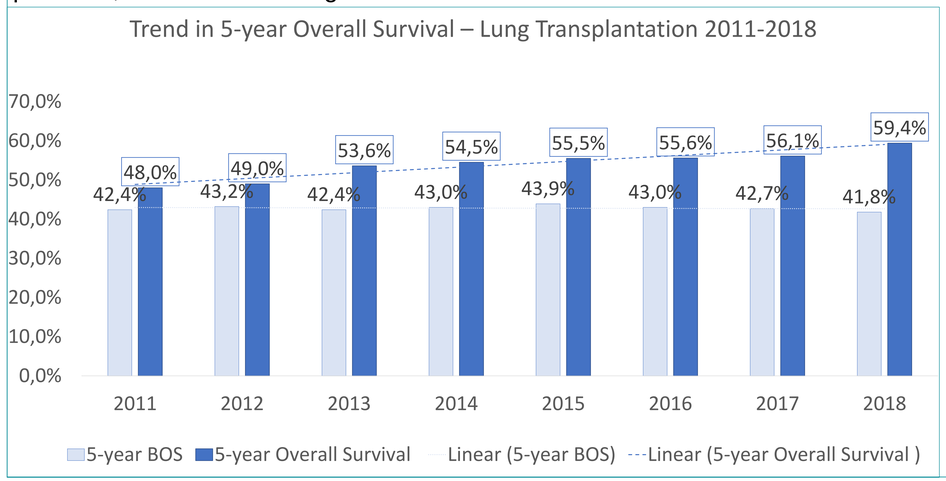
Results

LTx has registered a growth from 1758 lung transplants in 2011 to 2562 in 2018. This represents an increase of 46%. In the same period, the year-end waiting list has decreased from 1661 to 1419, a decrease of 15%. Although the number of transplant recipients could be increased substantially, the waiting list did not decrease to the same extent.

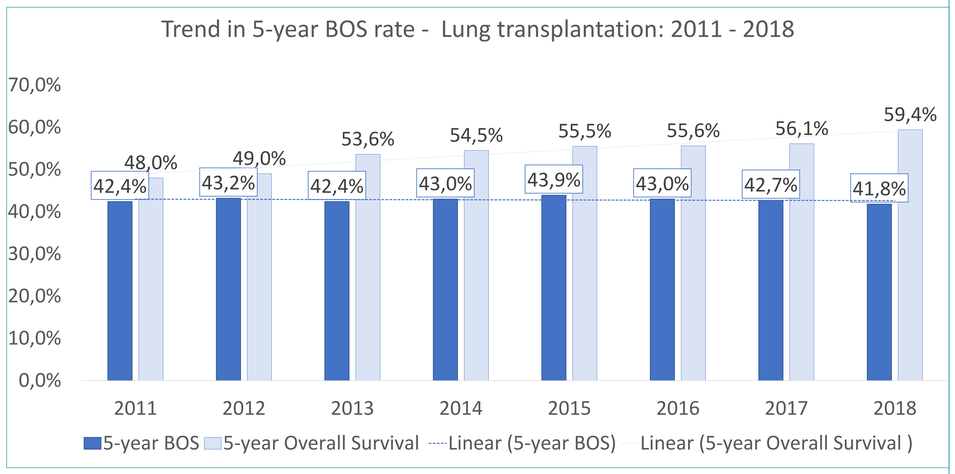


The per patient cost of lung transplantation in the US is estimated at USD $929,600 for single lung and at $1,295,900 for double lung in 2020, an increase of 7.9% and 8.8%, respectively versus 2017 data.

In 2018, 5-year overall survival was close to 60% versus 48% in 2011. One-year post-LTx, BOS is the leading cause of death.



This remains unchanged during the reporting period: in 2018, 41.8% of lung recipients were reported to suffer from BOS versus 42.4% in 2011.



Discussion

The number of lung transplantation has substantially grown between 2011 and 2018 in the United States, with an absolute increase of 804 transplantations. In the same time period, the years-end waiting list has only decreased by 242 patients listed and for the first time since 2014, the waiting list increased in 2018. The trend seen in the waiting list figures does not reflect the increase in LTx but could indicate a higher need for lung allografts.

5-year overall survival improved steadily over time reaching 59,4% in 2018. Yet, development of BOS within 5-years post-transplantation is still at 41,8%, virtually without change of rates. There is an unchanged same urgent need to address this complication since it has been over 3 decades the leading cause of post-transplant mortality[12]

Conclusion

The number of lung transplantations has increased since 2011, and overall patient survival improved. The trend on the waiting list, however, remains a major issue. Another concern is that the same rate of patients has developed BOS within the time period investigated. Increased investigation and scientific focus are therefore needed to better understand and improve therapeutic outcomes for chronic graft failure and its primary cause, BOS.