Commentary: Deep venous thrombosis in lung transplant recipients—tip of the iceberg that can potentially affect long-term outcome?

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Central Message

The impact of deep venous thrombosis (DVT) in lung transplantation is potentially underestimated. Jorge and colleagues have shown that routine DVT screening might be beneficial for this patient population.

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Deep venous thrombosis (DVT) reportedly affects 0.1% of persons per year in the general population.¹ This number is known to be greater in medical and surgical patients. For example, the overall incidence of venous thromboembolism after lung surgery, in a single-center study that prospectively collected data on patients without any DVT prophylaxis, was found to be 11.5%.² In the literature, the extent to which the DVT rate is said to be increased in surgical patients varies from study to study, but what is logically certain is that DVT occurs more commonly than we think—that is, the numbers that are published are probably just the “tip of the iceberg.” The issue is that a great majority, if not most, of these DVT episodes are silent or asymptomatic; without routine screening, the true incidence and prevalence are not exactly known. The relevant question, therefore, is whether diagnosing it early, or screening for this diagnosis, would lead to better long-term survival in people who are symptomatically or even asymptotically afflicted with this problem.

Despite the advances made in lung transplantation since its first case by James Hardy³ in 1963, the overall long-term outcome still remains poor compared with other solid-organ transplants. As such, various investigators have been examining whether the more subtle, subclinical, or asymptomatic pathologies, such as DVT, are indeed a significant problem in lung transplant patients. As early as 1995, Kroshus and colleagues⁴ in Dr Bolman’s group in Minnesota published, in this very *Journal*, their concerns about this problem after lung and heart–lung transplantations. Other investigators have also subsequently reviewed the incidence and complications of venous thromboembolic events in the lung transplant population^{5–7} and suggested that routine screening or surveillance is warranted. However, none of them has actually published a study that officially implemented a routine DVT screening protocol. That is, until now.

In this issue of the *Journal*, Jorge and colleagues⁸ at the University of Pittsburgh Medical Center are the first to report the evaluation of the impact of routine DVT screening on the outcome of post-lung transplant patients. The authors also more definitively examined the risk factors for the development of DVT in this patient population. This study is a retrospective chart review of 1141 patients undergoing lung transplant from over a 10-year period (2005 through 2014) at University of Pittsburgh Medical Center, from which DVT events were noted if they were diagnosed within the first 90 days after the lung transplant. The authors compared the pre- and post-screening groups (ie, pre-2008 and post-2008 periods) and concluded that the rate of DVT diagnosis “significantly increased after universal DVT screening was implemented.” They further concluded that, in this study, “a DVT episode is significantly associated with specific clinical variables,” which include no history of smoking, hypercholesterolemia, intensive care unit length of stay, and total hospital length of stay (by univariate analysis) and hypercholesterolemia and total hospital length of stay (by multivariate analysis). Although not statistically significant, the most important finding in this study, as compared with many other publications related to this subject, is that there was a trend toward improved 1-year and possibly longer-term survival when routine DVT screening was implemented.

The authors are to be congratulated on putting together the largest retrospective study in examining DVT incidence in lung transplant population. There is certainly much valuable information that can be extracted from this database. This paper is more than just a numerical report of the DVT incidence in lung transplant population. It demonstrates an association between routine DVT screening and better long-term survival in these lung transplant patients. Figure 2 in the paper visually offers the most convincing evidence in support of this finding.

When discussing the impact of DVT in lung transplantation, there are a number of special considerations that have to be kept in mind. The most striking secondary complication of DVT is, obviously, pulmonary embolism, which might be less well tolerated in lung transplant recipients due to the lack of intact bronchial circulation and, therefore, might more likely to cause pulmonary infarctions. Furthermore, multiple episodes of chronic pulmonary embolism may eventually lead to pulmonary hypertension. Other problems specifically related to lung transplant recipients are the local and subsequent systemic inflammatory responses that are generated by the thrombosis in this patient population, whose immune system is being suppressed and modulated from various antirejection medications and foreign antigens on the donor organ. As it can be argued, from the standpoint of pathogenesis, DVT and its complications may play an even more important role in the outcome of lung transplantation. Hence, it makes sense to consider routinely implementing DVT screening in this patient population.

In summary, Jorge and colleagues have demonstrated, for the first time in lung transplant recipients, that routine DVT screening is associated with increased diagnosis of DVT

and also with a trend for better 1-year survival after the lung transplant. Yes, this is not a randomized, double-blinded control trial, and the nature of using historical control as a comparison is well understood. However, the authors have shown that the more patients who are screened for DVT, the greater the rate of DVT diagnosis will be, as one might expect—what has been known in the literature thus far, in terms of its incidence and its impact on lung transplant recipients, is probably just the “tip of the iceberg.” What Jorge and colleagues have discovered is that, perhaps by routinely screening for DVT in this patient population, we might be able to start “chipping away at the iceberg” that may be holding us from improving the outcome of lung transplantation.

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