

The impact of cardiac surgery via median sternotomy on lung function: a prospective observational study

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Background

Postoperative pulmonary complications (PPCs) are common in patients undergoing major surgery and increase morbidity and mortality¹.

Patients undergoing cardiothoracic surgery experience decreased lung function for up to one year after surgery. Several strategies have been studied to manage PPCs, including lung expansion and pain control².

Risk factors for the development of PPCs include anesthesia, intraoperative adverse events, physical impairments, postoperative pain and activity limitation³.

Some studies have investigated the decline in lung function in patients undergoing specific cardiac procedures. We hypothesize that the surgical approach may have a greater impact on lung function than the surgical procedure itself.

The primary outcome is to observe the reduction in lung volumes in patients undergoing elective median sternotomy cardiac surgery.

Materials and methods

Adult patients scheduled for elective median sternotomy cardiac surgery, who could perform a spirometry and provided the informed consent were eligible for the study.

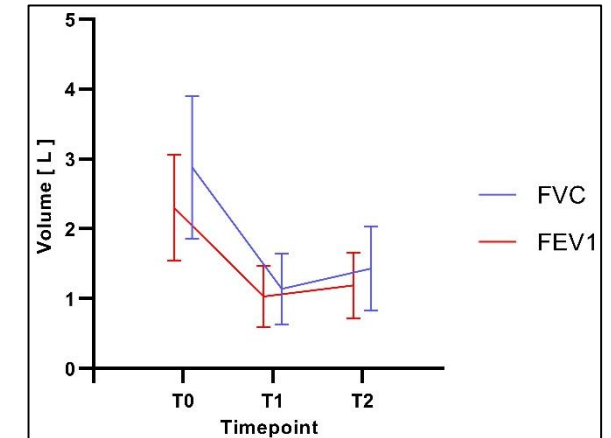
A spirometry for lung function assessment was performed before surgery (T0), on the second postoperative day or at discharge from the intensive care unit (T1), and on the sixth postoperative day or at hospital discharge (T2).

Results

Between February 2022 and June 2023, 71 patients signed the informed consent and performed the spirometry at T0. Of those, 19 patients were excluded due to the use of non-median sternotomy access or because they did not undergo the surgery. A total of 52 patients were included in the final analysis. The study population had a median age of 68 (59-72), a median body mass index of 25 (23-28) and 30 (58%) of them were men.

Forced vital capacity (FVC) and forced expiratory volume in the first second (FEV1) at T0 were 2.88 ± 1.02 L and 2.30 ± 0.76 L, respectively.

At T1 the FVC and FEV1 were 1.14 ± 0.50 L and 1.03 ± 0.44 L corresponding to 38% and 43% of the value at T0. At T2 the FVC and FEV1 were 1.43 ± 0.60 L and 1.19 ± 0.47 L corresponding to 49% and 52% of the value at T0. For both variables, the changes between T0 and T1, between T1 and T2 and between T0 and T2 were statistically significant ($P < 0.05$).



Conclusion

Lung function in patients undergoing elective median sternotomy cardiac surgery is significantly reduced after surgery compared to baseline.

A few days post-surgery, the lung function improves even if there is no return to baseline values.

References

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