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Letter to Editor

Outcomes of lung-surgery patients suffered perioperative COVID-19: A systematic review of case series



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To the editor,

Coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was first reported in China in December 2019, then the disease spread worldwide.¹ On 11 March, the World Health Organization (WHO) urgently declared

that COVID-19 outbreak should be classified as a pandemic with worsening situation.² By 28 January 2021, it was reported that confirmed patients had exceeded 100 million and cumulative deaths had been over 2 million worldwide.³ A case series study included 9 cardiac surgery patients diagnosed COVID-19 in early postoperative period demonstrated a mortality as high as 44%.⁴ Kevin C and colleagues have demonstrated mortality of hip fracture patients with concomitant COVID-19 infection in early postoperative period reached 32.6% which is much higher than non-surgery patients.⁵ Other studies also have demonstrated a higher severe morbidity and mortality for surgery patients suffered perioperative COVID-19. However, there existed no studies exploring mortality and risk factors of lung-surgery patients suffered perioperative COVID-19, only some case reports and case series studies existed so far. As the target organ of COVID-19, how's the outcome of lung-surgery patients suffered perioperative coronavirus disease 2019 (COVID-19)?

Table 1
 Overall analysis of all patients according to different variables.

Characteristics	Survival (n)	Death (n)	Death rate	Difference	P
Total	36	16	30.77%		
Age				–13.94%	0.282
≤60	17	5	22.73%		
> 60	19	11	36.67%		
Smoking				12.36%	0.355
Yes	14	8	36.36%		
No	19	6	24%		
NA	3	2	40%		
Comorbidity				17.99%	0.174
Yes	17	10	37.04%		
No	17	4	19.05%		
NA	2	2	50%		
Postoperative infection					
Total	29	13	30.95%		
Age				–17.04%	0.426
≤60	12	3	20%		
> 60	17	10	37.04%		
Histology				–22.97%	0.567
Malignancy	27	10	27.03%		
Benign	2	2	50%		
NA	0	1	100%		
Smoking				9.8%	0.762
Yes	14	7	33.33%		
No	13	4	23.53%		
NA	2	2	50%		
Comorbidity				11.11%	0.825
Yes	20	10	33.33%		
No	7	2	22.22%		
NA	2	1	33.33%		
Postoperative hospital duration				–11.84%	0.423

Table 1 (continued)

Characteristics	Survival (n)	Death (n)	Death rate	Difference	P
≤26	15	5	25%		
> 26	12	7	36.84%		
NA	3	1	33.33%		
Preoperative infection					
Total	7	3	30%		
Gender				–33.33%	0.500
Man	5	1	16.67%		
Woman	2	2	50%		
Surgery				20%	1.00
Lobectomy	3	2	40%		
Wedge resection	4	1	20%		
Histology				–25%	1.00
Malignancy	1	1	50%		
Benign	6	2	25%		
Method				–33.33%	0.500
Open	3	0	0%		
MILS	4	2	33.33%		
NA	0	1	100%		
Smoking				75%	0.429
Yes	0	1	100%		
No	4	2	25%		
NA	1	0	0%		
PCR positive point				–25%	1.00
Preoperation	6	2	25%		
postoperation	1	1	50%		
Postoperative hospital duration				25%	1.00
≤26	2	2	50%		
> 26	3	1	25%		
NA	2	0	0%		

We conducted this systematic review to answer this question.

We comprehensively searched literature in database of PubMed, OVID and Web of Science, searching terms: (lobectomy OR segmentectomy OR wedge resection OR lung resection OR pulmonary resection OR pneumonectomy), (coronavirus disease 2019 OR COVID-19), then combined the two terms with AND. The searching deadline was January 11, 2021. Inclusion criterion and exclusion criterion were demonstrated in supplementary. A two-side P value of <0.05 was considered statistically significant.

After comprehensive searching, totally 212 studies were identified and 20 articles containing 52 eligible patients for analysis.^[15–34] Totally 16 patients died even after treatment among all 52 patients and mortality reached 30.77% for lung-surgery patients suffered perioperative COVID-19. Comparison between survival group and death group was conducted, results demonstrated there were no statistically different variable existing, while mortality difference exceeded 10% in older patients, smoking patients and patients complicated with comorbidity. Patient mortality of postoperative infection was 30.95%, no differences were found between death group and survival group concerning each variable. But mortality difference of exceeding 10% including variables of age, histology, comorbidity and postoperative duration, mortality difference of different smoking status also reached 9.8%. Mortality was 30% in 10 patients infected before surgery, comparison between survival group and death group also found no risk factors with significantly statistical difference. All shown in [Table 1](#).

In conclusion, this study demonstrated that patients received lung surgery and followed suffering COVID-19 had a mortality of 30.95%, while those first suffered COVID-19 and followed lung surgery had a mortality of 30%. Total mortality was 30.77% for lung-surgery patients suffered perioperative COVID-19.

Abbreviations

Abbreviations were demonstrated in supplementary.

Ethical approval

The authors have no disclose to ethical statement.

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Authors' contributions

(I) Conception and design: YD L, GH AL; (II) Administrative support: YD L (III); Provision of study materials or patients: GH AL (IV); Collection and assembly of data: NY D; (V) Data analysis and interpretation: GH AL, NY D; (VI) Manuscript writing: All authors; (VII) all authors have read and approved the manuscript.

Declaration of competing interest

None.

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The whole article could be seen in “Appendix Supplementary Data”.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.asjsur.2022.01.052>.

References

1. Wilder-Smith A, Chiew CJ, Lee VJ. Can we contain the COVID-19 outbreak with the same measures as for SARS? *Lancet Infect Dis.* 2020;20(5). [https://doi.org/10.1016/S1473-3099\(20\)30129-8](https://doi.org/10.1016/S1473-3099(20)30129-8). e102–e107.
2. World Health Organization. reportCoronavirus Disease (COVID-19). Situation Report. https://www.who.int/docs/default-source/coronaviruse/situationreports/20200610-covid-19-sitrep-142.pdf?sfvrsn=180898cd_6.
3. <https://news.qq.com/zt2020/page/feiyuan.htm#/global>.
4. Yates MT, Balmforth D, Lopez-Marco A, et al. Outcomes of patients diagnosed with COVID-19 in the early postoperative period following cardiac surgery. *Interact Cardiovasc Thorac Surg.* 2020;31(4):483–485. <https://doi.org/10.1093/icvts/ivaa143>. Oct 1.
5. Wang KC, Xiao R, Cheung ZB, et al. Early mortality after hip fracture surgery in COVID-19 patients: a systematic review and meta-analysis. *J Orthop.* 2020;22:584–591. <https://doi.org/10.1016/j.jor.2020.11.012>. Nov-Dec.

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