Case report

Asymptomatic renal infarction after left upper lobectomy: Case report

Nozomu Motono *, Masahito Ishikawa, Shun Iwai, Yoshiiito Iijima, Hidetaka Uramoto

* Department of Thoracic Surgery, Kanazawa Medical University, 1-1 Daigaku, Uchinada, Ishikawa 920-0293, Japan

ARTICLE INFO

Keywords:
Renal infarction
Left upper lobectomy
Thrombus
Anticoagulation therapy

ABSTRACT

Background: Renal infarction after pulmonary resection is relatively rare; however, it is associated with severe morbidity. Case presentation: An 80-year-old woman without any severe comorbidity or smoking history underwent left upper lobectomy (LUL) concomitant with mediastinal lymph node dissection for lung adenocarcinoma. She did not show fever, flank pain, and/or nausea; however, laboratory data revealed an elevated white blood cell count (WBC) (13,460 cells/mm³) and elevated serum lactate dehydrogenase (LDH) (670 IU/L) and C-reactive protein (CRP) (23.6 mg/dL) levels on the fifth postoperative day. Contrast-enhanced computed tomography from the thorax to the pelvic cavity revealed a partial defect of the right kidney without any indication of infection and no pulmonary vein stump thrombosis. We diagnosed the patient with partial right renal infarction, and heparin (10,000 IU/day) was initiated. Laboratory data showed gradual reduction in the WBC (7700 cells/mm³), as well as in the serum LDH (355 IU/L) and CRP (0.76 mg/dL) levels, 7 days after heparin initiation. Anticoagulation therapy including heparin administration was discontinued because renal function remained, and we observed no pulmonary vein stump thrombosis. Laboratory data remained within normal limits, and the patient was discharged on postoperative day 15.

Conclusions: LUL is considered a risk factor for this condition, and elevated WBC, as well as serum LDH and CRP levels are useful diagnostic indicators.

1. Background

Renal infarction after pulmonary resection is relatively rare; however, it is associated with severe morbidity. Reportedly, the incidence rate is 0.5%, and the risk of this complication is higher in cases of left upper lobectomy (LUL) than in other types of lobectomy [1]. Renal infarction is attributed to pulmonary vein stump thrombosis in such cases. Studies have shown that the incidence rate of post-lobectomy pulmonary vein stump thrombosis was 3.6%; thrombosis occurred in 13.5% of patients who underwent LUL [2].

An autopsy study reported that the incidence of renal infarction was 1.4%, and clinical diagnosis was documented in only 0.014% cases [3]. Renal infarction after pulmonary resection is rare, and this complication has typically been reported after LUL [4–10]. This condition is characterized by flank pain, fever, and nausea, which were reported in all cases described in the literature; however, pulmonary vein stump thrombosis is rare.

We report a case of asymptomatic post-LUL renal infarction without pulmonary vein stump thrombosis, together with a literature review and analysis of the clinical characteristics of post-lobectomy renal infarction.

2. Case presentation

An 80-year-old woman without any severe comorbidity or smoking history underwent LUL concomitant with mediastinal lymph node dissection for lung adenocarcinoma (Fig. 1a). We observed no intra-operative complications, and her postoperative course was uneventful until the fourth postoperative day. She did not show fever, flank pain, and/or nausea; however, laboratory data revealed an elevated white blood cell count (WBC) (13,460 cells/mm³) and elevated serum lactate dehydrogenase (LDH) (670 IU/L) and C-reactive protein (CRP) (23.6 mg/dL) levels on the fifth postoperative day. Contrast-enhanced computed tomography from the thorax to the pelvic cavity revealed a partial defect of the right kidney without any indication of infection and

Abbreviations: LUL, left upper lobectomy; WBC, white blood cell; LDH, lactate dehydrogenase; CRP, C-reactive protein.

* Corresponding author.

E-mail addresses: motono@kanazawa-med.ac.jp (N. Motono), masa-i@kanazawa-med.ac.jp (M. Ishikawa), mhg1214@kanazawa-med.ac.jp (S. Iwai), y-iijima@kanazawa-med.ac.jp (Y. Iijima), hidetaka@kanazawa-med.ac.jp (H. Uramoto).

https://doi.org/10.1016/j.ijscr.2021.106254
Received 29 June 2021; Accepted 27 July 2021
Available online 31 July 2021

2210-2612/© 2021 The Authors. Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).
no pulmonary vein stump thrombosis (Fig. 1b, c). We diagnosed the patient with partial right renal infarction, and heparin (10,000 IU/day) was initiated. Laboratory data showed gradual reduction in the WBC (7700 cells/mm$^3$), as well as in the serum LDH (355 IU/L) and CRP (0.05 mg/dL) levels, 7 days after heparin initiation. Anticoagulation therapy including heparin administration was discontinued because renal function remained, and we observed no pulmonary vein stump thrombosis. Laboratory data remained within normal limits, and the patient was discharged on postoperative day 15. The patient’s WBC (6300 cells/mm$^3$), serum LDH (172 IU/L), and CRP (0.05 mg/dL) levels were within normal limits, and renal function was satisfactory without any anticoagulation therapy at the 3-month follow-up.

3. Discussion

Renal infarction is rare and diagnostically challenging because its symptoms mimic those associated with renal pyelonephritis, renal colic, acute mesenteric events, or urinary tract infection, which delays treatment initiation. This condition is characterized by abdominal or lumbar pain, fever, and nausea or vomiting, and studies have reported that renal infarction was accurately diagnosed at admission in only 40% of patients [11]. Table 1 summarizes cases of renal infarction after pulmonary resection reported in the literature [4–10]. Contrary to the clinical presentation in previously reported cases, our patient did not present with flank pain, and/or fever, vomiting, or nausea.

In contrast to previously reported laboratory data, including urinalysis and blood investigations, which showed hematuria or elevated WBC and serum LDH, CRP, or creatinine [4–11], our patient only showed elevated WBC and serum LDH and CRP levels without hematuria or elevated serum creatinine. Renal function was maintained because she developed only partial infarction of the right kidney.

To date, all cases of renal infarction after pulmonary resection have occurred primarily in patients who underwent LUL, and pulmonary vein stump thrombosis was observed in only three patients (33%). Renal infarction after pulmonary resection occurred in nearly all patients within 14 days postoperatively. Nearly all patients received anticoagulation therapy, including heparin and/or warfarin, or dipyridamole; however, no standard guidelines are available with regard to the duration of anticoagulant therapy. A few studies have reported resolution of the pulmonary vein stump thrombus and recovery of renal function using sustained anticoagulant therapy [9,10]; however, the role of sustained anticoagulation therapy in patients without confirmed thrombosis remains unclear. A previous study suggested that the efficacy of non-anticoagulation therapy is similar to that of anticoagulation therapy to prevent recurrent or de novo thrombosis after idiopathic renal infarction and that this approach is associated with a lower risk of bleeding [12]. Although anticoagulation therapy was administered for only 7 days in our patient, recurrent renal infarction did not occur.

In conclusion, renal infarction after pulmonary resection is rare and diagnostically challenging, which results in a delay in treatment. LUL is considered a risk factor for this condition, and elevated WBC, as well as serum LDH and CRP levels are useful diagnostic indicators. Sustained anticoagulation therapy for renal infarction without thrombosis remains controversial.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Funding

There are no external funding resources for the study.

Ethical approval

Ethical approval not required.
Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Registration of research studies

Not applicable.

Guarantor

Hidetaka Uramoto.

CRediT authorship contribution statement

Nozomu Motono performed the research, collected and analyzed the data and wrote the paper. Masahito Ishikawa, Shun Iwai, and Yoshihito Iijima contributed to sample collection. Hidetaka Uramoto contributed to supervision of this study and revision of the manuscript.

Declaration of competing interest

The authors report no declarations of interest.

References

[1] K. Matsumoto, S. Sato, M. Okumura, H. Niwa, Y. Hida, K. Kaga, et al., Left upper lobectomy is a risk factor for cerebral infarction after pulmonary resection: a multicentre, retrospective, case-control study in Japan, Surg. Today 50 (2020) 1383–1392.
[2] K. Ohtaka, Y. Hida, K. Kaga, T. Kato, J. Muto, R. Nakada-Kubota, et al., Thrombosis in the pulmonary vein stump after left upper lobectomy as a possible cause of cerebral infarction, Ann. Thorac. Surg. 95 (2013) 1924–1929.
[3] S. Abe, H. Arruda, J. Cur, Concomitant renal and splenic infarction, Int. Braz. J. Urol. 26 (2000) 526–527.
[4] H. Oura, M. Hirose, H. Aikawa, M. Ishiki, Abdominal organ infarction encountered immediately after surgery of primary lung cancer, Kyobu Geka 58 (2005) 137–142.
[5] E. Nagaoka, M. Yano, T. Sugano, T. Miyamoto, Thrombus in the left superior pulmonary vein after left upper pulmonary lobectomy, J. Thorac. Cardiovasc. Surg. 135 (2008) 709–710.
[6] T. Sawada, Y. Watanebe, H. Ohura, Abdominal organ infarction encountered after surgery for primary lung cancer, Nippon Kyobu Geka Gakkai Zasshi 23 (2009) 161–164.
[7] C. Asteriou, N. Barbetakis, A. Efstratiou, A. Kleontas, C. Tsilikas, Renal artery thrombosis following lobectomy for lung cancer, Case Rep Oncol 3 (2010) 208–211.
[8] M. Tamaki, K. Miura, K. Norimura, K. Kenzaki, K. Yoshizawa, Renal infarction and acute obstruction of the lower extremity encountered after surgery for primary lung cancer, Kyobu Geka 66 (2013) 138–141.
[9] S. Manabe, Y. Oshima, M. Nakano, T. Fujii, T. Maehara, K. Nitta, et al., Renal infarction in a patient with pulmonary vein thrombosis after left upper lobectomy, Case Rep. Nephrol. Urol. 4 (2014) 103–108.
[10] T. Koga, T. Mori, H. Shibata, K. Ikeda, K. Shinashi, M. Suzuki, Two cases of organ infarction due to thrombus in pulmonary vein stump after left lung lobectomy, Jpn. J. Chest Surg. 30 (2016) 621–627.
[11] for the SCARE Group, R.A. Agha, T. Franchi, C. Sohrabi, G. Mathew, The SCARE 2020 guideline: updating consensus Surgical Case Report (SCARE) guidelines, Int. J. Surg. 84 (2020) 226–230.
[12] M.I. Khayat, R. Nee, D.J. Little, S.W. Olson, Idiopathic renal infarction and anticoagulation, TH Open 3 (2019) 231–234.