Coil과 Fibrin Glue를 이용한 기관지 내시경하 기관지 늑막강루의 치료

-1예 보고-

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Bronchoscopic Treatment of a Bronchopleural Fistula with using Coils and Fibrin Glue

-A case report-

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Bronchopleural fistula (BPF) is relatively rare, but it has high morbidity and mortality rates and it is associated with a prolonged hospital stay and high costs. Surgical treatment is the treatment of choice, but other minimal invasive forms of conservative management, and particularly bronchoscopy, have recently been investigated. We report here on the bronchoscopic treatment of a bronchopleural fistula accompanied necrotizing pneumonia, and we used coils and fibrin glue to treat the fistula.

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Key words: 1. Pleural disease
2. Bronchus
3. Bronchoscopy
4. Pleural fistula

CASE REPORT

A 48-year-old man was transferred from other hospital due to necrotizing pneumonia accompanying a bronchopleural fistula. Klebsiella pneumoniae were cultured and systemic antibiotics and closed thoracostomy did not produce a good response. After 3 weeks of medical treatment, sputum and pus were negative by microbiologic studies, but fever and pus drainage were sustained and the patient deteriorated. A bronchopleural fistula (BPF) tract in the apical segment of right upper bronchus was detected by flexible bronchoscopy (Olympus, Japan) using a 3 fr. Fogarty catheter. After agreeing to endoscopic treatment, the patient was moved to the operation room under general anesthesia.

The BPF tract was reconfirmed by gastrograffin and three embolization coils (embolization stainless steel coil, 0.035 inch, 3-4, 3-5, 5-5, Cook, USA) were introduced via a bronchoscopy biopsy port into the apical segment of the right upper bronchus. After coil positioning had been confirmed by C-arm, fibrin glue (2 cc; Greenplast, Korea Green Cross Corporation) was injected into the bronchus air tract using a Swan-Ganz catheter (Edwards Laboratories; Santa Ana, CA). At the same time, distal ballooning via the Swan-Ganz catheter was maintained for 5 minutes to achieve a glue seal[1].

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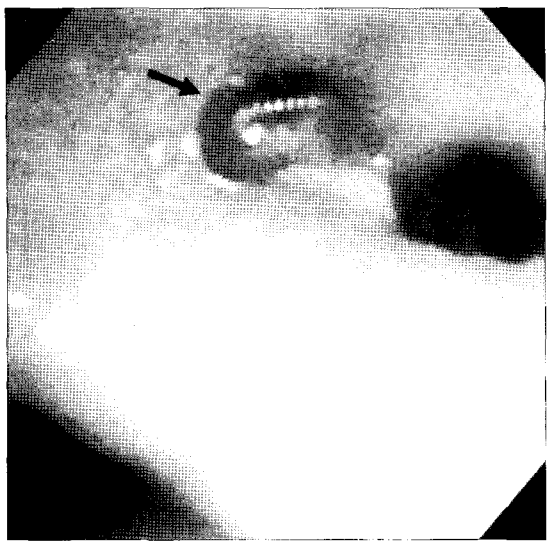

Fig. 1. Bronchoscopic finding of a BPF tract on postoperative day 14 - showing the anchoring of coils by fibrin glue. BPF=Bronchopleural fistula.

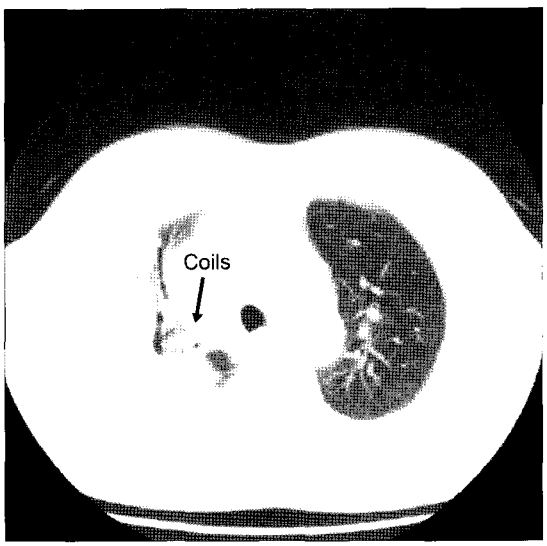

Fig. 2. Chest CT showing only pleural thickening and well positioned coils in the BPF tract at 7 months postoperatively. However, minimal parenchymal consolidation and small dead space were noted. Thus, we intend to carefully follow the patient by chest CT. BPF=Bronchopleural fistula.

No leakage of gastrograffin was observed into the pleural space and air leakage through the chest tube was not observed. After extubation, the patient was transferred to a recovery room. On postoperative day 1, minimal air leakage was observed but amounts of air leakage and pus drainage were not significant. On postoperative day 6, no air leakage was detected. Proper positioning of coils and fibrin glue were visualized by bronchoscopy on postoperative day 14 (Fig. 1), and microbiologic studies of sputum and pus drainage remained negative. The patient was discharged after removing the chest tube on postoperative day 17. There were no irritation signs of coils, e.g., coughing, chest discomfort or foreign body sensation, developed during the follow up period. At 7 months after the procedure chest CT showed no specific findings other than pleural thickening (Fig. 2), although minimal parenchymal consolidation and small dead space were noted. Thus, we intend to follow the patient closely by chest CT.

DISCUSSION

Generally, surgical or nonsurgical treatments may be used to treat BPF. The surgical treatments are standard tube thoracostomy, image-guided percutaneous tube thoracostomy, open drainage, decortication, direct stump closure with intercostal muscles reinforcement, omental flap, transsternal bronchial closure, and thoracoplasty with or without extrathoracic chest wall muscle transposition, and thoracoscopy (VATS)[2,3].

However, the efficacies of nonsurgical treatments, especially bronchoscopic treatments, have been challenged. In 1977, the first treatment of BPF by bronchoscopy using tissue glue and lead shot was reported[4,5], and since, many studies that have used multiple sealing compounds have been reported. In particular, in Korea, BPF closure using vascular occluding coils has been reported[6]. However, all of these publications have been limited to case reports, and no controlled study has addressed the comparative safety and efficacy of these treatment modalities.

Two steps are necessary to treat BPF by bronchoscopy. First, the localization of the BPF tract, especially peripheral BPF (distal BPF) is possible using a balloon catheter occlusion technique (e.g., a Fogarty or a Swan-Ganz catheter). Second, the application of various sealants is important, i.e., lead shot, ethanol, polyethylene glycol, cyanoacrylate glue, fibrin glue, blood clots, antibiotics, albumin-glutaraldehyde tissue adhesive, cellulose, gel foam, coils, balloon catheter occlusion, silver nitrate, calf bone, surgical sponge, silicon spi-

got, human spongiosa, and stents[2].

At present, some consensus has been reached concerning BPF treatment by bronchoscopy, especially in terms of site and size. BPFs of over 8 mm are unsuitable for endoscopic management and distal small BPFs are suitable for bronchoscopic therapy, whereas large or central BPFs are best managed surgically[2]. Moreover, two-stage intervention may be indicated in high-risk patients, i.e., and initial endoscopic treatment to close or decrease the BPF with nutritional and rehabilitative support followed by definitive surgical intervention[2].

In the present case, the BPF site was peripheral and of small size (less than 8 mm). Thus, we decided to use a bronchoscopic approach. We considered that more precise, meticulous procedures were possible under general anesthesia because it eliminated problems associated with patient coughing and irritability. The contrast agent gastrograffin was useful to reconfirm the fistula site and proper coil anchoring and no adverse reactions were noted. In addition, we considered that coils may be dislodged or expectorated, especially during the early anchoring phase. Thus, to increase adhesion during the early phase, we used biologic glue. After positioning vascular embolization coils at the diseased bronchus tract, biologic glue was distilled into the tract. The authors suggest that this treatment be considered as treatment option for BPF, especially for distal or small airway disease.

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=국문 초록=

기관지늑막강루는 드문 질환이지만, 일단 생기면 높은 이완율과 치명률을 보이며 입원 기간과 비용 부담이 초래되는 합병증의 하나이다. 일반적으로 수술적 치료가 우선이지만, 최근 들어 비침습적 방법으로 기관지 내시경을 이용한 치료가 보고되고 있다. 괴사성 폐렴에 합병된 기관지 늑막강루를 코일과 글루를 사용하여 기관지내시경을 이용, 성공적으로 치료하였기에 그 결과를 보고한다.

중심 단어 : 1. 늑막 질환
2. 기관지
3. 기관지내시경
4. 늑막 누공