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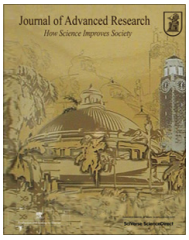

CASE REPORT

Treatment for resistant subphrenic abscess by combined intracavitary doxycycline and cyanoacrylate injection

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ABSTRACT

We report the case of a male patient with resistant subphrenic abscess complicating radiofrequency ablation (RFA) of two left lobe hepatocellular carcinoma (HCCs). The causative organism was multidrug resistant *Escherichia coli*. Percutaneous pigtail drainage together with IV antibiotics failed to resolve the abscess which persisted for 4 months. Intracavitary doxycycline injection causes moderate reduction in the volume of the drained fluid. This was followed by percutaneous cyanoacrylate injection inside the abscess cavity and the fistulous tract which causes complete resolution of the abscess.

Introduction

An abscess is one of the most common major complications encountered after RF ablation. Diagnosis of an abscess can sometimes be delayed because fever after RF ablation is a frequent symptom of not only abscess but also postablation syndrome [1,2]. Most abscesses can be successfully managed with simple aspiration or percutaneous catheter drainage coupled with adequate antibiotics [3].

Cyanoacrylate is a tissue adhesive agent that has been used as treatment modality in many areas of medicine, especially in wound healing and occlusion of different kinds of fistulae as ileocutaneous fistula following alveolar Hydatid disease surgery and bilio-hepatico-cutaneous and bilio-hepatico-phrenico-bronchial fistulae [4,5].

Case report

This is a 60 years male patient with HCV related chronic liver disease (Child A class). On routine ultrasound screening for his cirrhotic liver, two left lobe focal lesions were discov-

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ered, further Triphasic CT abdomen revealed two lobe focal lesions measuring 2×2 cm and 3×3 cm with typical vascular pattern of HCC. These lesions were treated by three sessions of RFA using Radiotherapeutic 3000 Boston scientific® with Leveen needle 3.5 cm. Two weeks after the third session of RFA, the patient developed high fever 40 °C together with severe epigastric pain and productive cough. Subsequent ultrasound examination revealed left subphrenic collection. Triphasic CT abdomen revealed subphrenic collection ($5 \times 4 \times 4$ cm) and complete ablation of the treated focal lesions.

Ultrasound guided aspiration was done using Chiba needle 18 gauge and revealed 300 cc of dark yellow fluid. Empiric antibiotics were given in the form of IV imipenem and Cilastatin (Tienam®) 500 mg/8 h IV infusion and amikacin (Amikin®) 500 mg/8 h IV infusion for 14 days. The general condition of the patient was partially improved. On follow-up ultrasound, one week later the same collection was detected, so drainage was done using pigtail catheter 10F. Subsequent analysis of the drained fluid revealed exudates with pus cells 5000/mm^3, negative for bilirubin. Repeated (5 times) culture and sensitivity revealed *Escherichia coli* resistant to all groups of antibiotics (Multidrug resistant *E. coli*). The pigtail catheter was draining about 300–600 cc of pus daily for 4 month. It was changed twice during this period.

After we took the ethical permission of our institution's review board in addition to informed consent from the patient and his wife, local injection of one gram doxycycline (the powder of 10 capsules, 100 mg each, was dissolved in 20 cc saline) was done through the catheter, and the catheter was closed immediately after the injection for 4 h; then, fluid drainage was resumed. On the second day, the amount of the drained fluid decreased markedly to about 50 cc daily, another two sessions were done 2 weeks apart, but no further reduction in the volume of the drained fluid was obtained. Analysis of the drained fluid revealed few pus cells, and culture and sensitivity revealed persistence of the same organism (Multidrug resistant *E. coli*).

The pig catheter was removed, one day later, a Chiba needle (18 gauge) was inserted inside the abscess cavity, and about 50 cc of fluid was aspirated with complete evacuation of the abscess; then, 3 ampoules (each ampoule is containing 0.5 ml) of cyanoacrylate (Histoacryl®) mixed with 2.5 ml Lipiodol (total volume is 4 ml) were injected inside the abscess cavity, while the needle in place and also in its fistulous tract as the needle is withdrawn under real-time complete sonographic guidance with biopsy attachment (Fig. 1). Before injection of cyanoacrylate, we ensured that we inject in a closed space; no communication with nearby vessels as evidenced by doppler study, and also, the fluid was negative for bilirubin, so it was not communicating with a biliary radical. The patient condition improved completely with no further collections detected on follow-up ultrasound weekly for 2 months. Abdominal Ultrasonography (Fig. 2) and Triphasic CT abdomen (Fig. 3) were done after 2 days and revealed condensation of the cyanoacrylate inside the abscess cavity and the fistulous tract, completely sealing it with no more collections detected. No complications were encountered during or after the maneuver as pain, fever, or distant embolic manifestations. The patient was free of fever with obliteration of the abscess cavity and sinus over a 6 months period of follow-up.

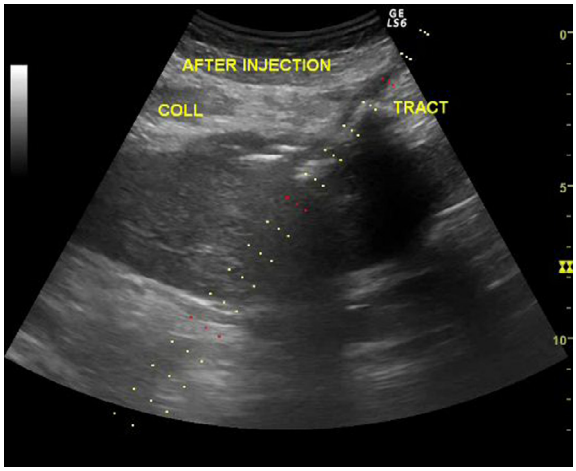

Fig. 1 Abdominal ultrasound picture immediately after injection.

Discussion

Our search of the literature revealed no similar cases of sealing of subphrenic abscess cavity with combined use of tetracycline and cyanoacrylate. However, the fewer cases found were of fistulae closure. Herold and Danz [5] described the first case of a female patient with persisting bilio-bronchial and bilio-cutaneous fistulae originating in the right liver lobe. The causative factor was a subphrenic liver abscess which had been adequately and successfully treated. No biliary obstruction was detectable on admission. Such a fistulous system was sealed by repeated fibrin and Histoacryl-sealing through an endoscopically guided catheter. Another case of bileocutaneous fistula following alveolar Hydatid disease surgery treated successfully with percutaneous Cyanoacrylate [4].

In a recently published case report from Republic of Korea, an abscess–colonic fistula developed after RFA for HCC. This case was treated by percutaneous abscess drainage and antibiotics and occlusion of abscess–colonic fistula with *n*-butyl-2-cyanoacrylate embolization [6].

Tetracycline powder has been used as a cheap effective drug to induce pleurodesis in cases of malignant pleural

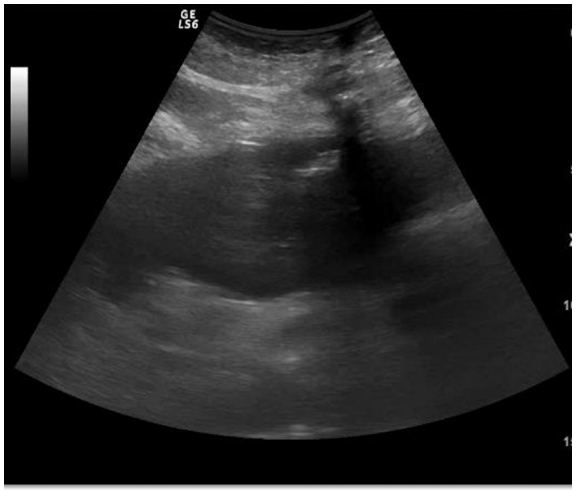

Fig. 2 Abdominal ultrasound picture 3 days after injection of C.

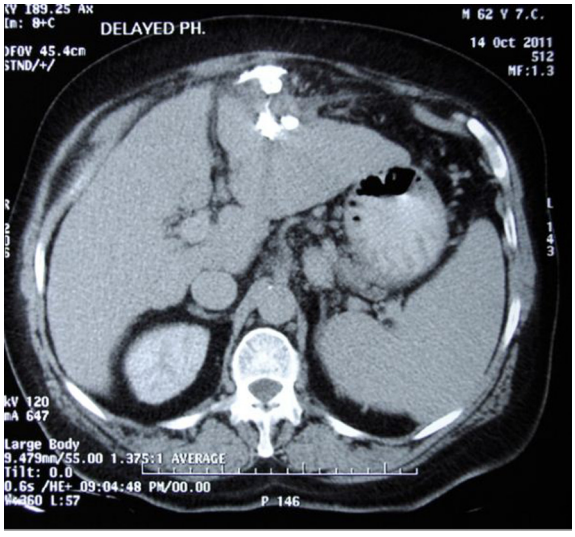

Fig. 3 Delayed phase of Triphasic CT abdomen 2 days after Cyan.

effusion, and the mechanism of pleurodesis is based on pleural irritation to create an inflammatory reaction leading to fibrogenesis [7].

In our study, we used both percutaneous intracavitary injection of doxycycline and cyanoacrylate. Injection of tetracycline aimed to give high concentration of the antibiotics locally to kill the organism and to induce fibrosis to seal the abscess cavity. Doxycycline significantly reduced the volume of the drained fluid but not completely obliterated the abscess cavity or its cutaneous fistula; in addition, it cleared the fluid from the pus cells. Injection of cyanoacrylate completely closed the abscess together with the fistulous tract created by persistence of the pigtail for about 4 months.

Conclusions

Combination of both percutaneous Intracavitary doxycycline and cyanoacrylate may be helpful in managing similar cases of resistant subphrenic abscess in the future; however, further documented case studies are needed before advising this novel technique in the management of similar cases.

Conflict of interest

The authors have declared no conflict of interest.

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