

## Images in Infectious Diseases

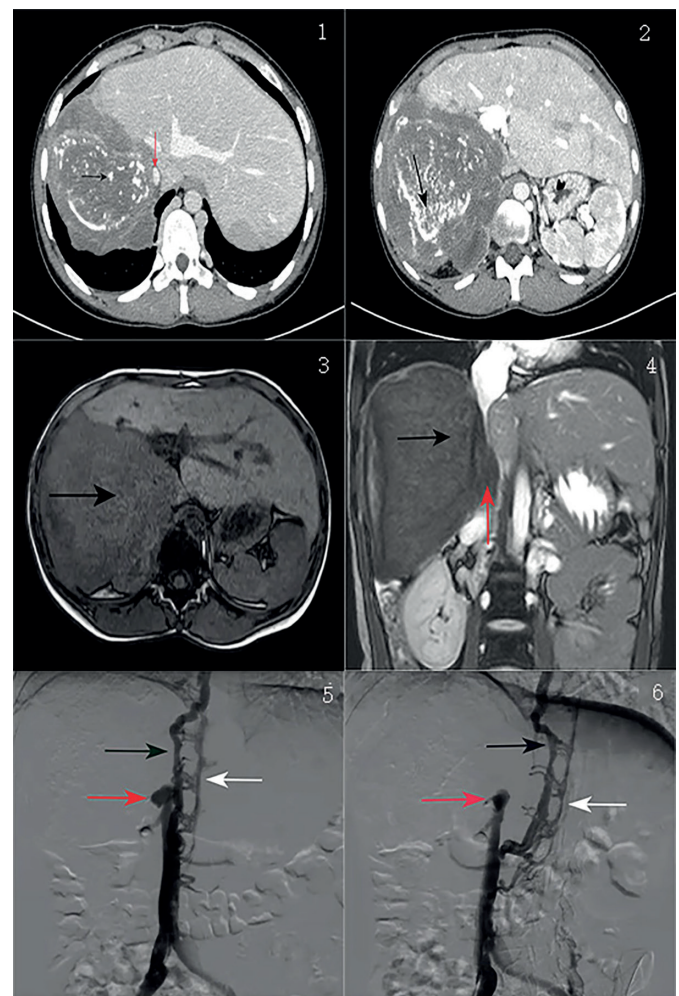
# Treatment of hepatic alveolar echinococcosis infringing the inferior vena cava

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A 27-year-old Tibetan woman from the pastoral area of Qinghai Province was admitted to our hospital without any discomfort. Physical examination revealed liver-occupying lesions in August 2017. On abdominal contrast-enhanced computed tomography and magnetic resonance imaging, a  $111 \times 15 \times 10 \text{ mm}^3$ -sized irregular lesion was found in the right third lobe and caudate lobe of the liver, extending to the right adrenal gland and invading the diaphragm, inferior vena cava (IVC), and hepatic hilus (**Figure A: 1–4**). On IVC venography, the vein was completely blocked and collateral circulation such as the azygos and hemi-azygos veins was well compensated (**Figure A: 5 and 6**). The WHO-IWGE PNM classification system was P4N1M0 phase.<sup>1,2</sup> We performed three-dimensional reconstruction and virtual excision of the liver before operation, using IQQA-Liver (EDDA technology, USA; **Figure B: 1 and 2**). Hepatic right third lobe and caudate lobectomy combined with retrohepatic IVC resection was performed. We had to perform a stepwise resection because the large lesion limited the operating space (**Figure C: 1–3**). We decided to ligate and cut the blocked IVC between 1 cm below and above the confluence of the right and left hepatic veins, respectively (**Figure C: 4 and 5**). Postoperative pathological results confirmed hepatic alveolar echinococcosis (HAE) and an invaded IVC (**Figure B: 3 and 4**). Enlarged lymph nodes were removed during the operation, and postoperative pathological results indicated lymph node reactive hyperplasia (**Figure B: 5**). Approximately 70% of HAE lesions are located in the right lobe, and 40% encroach the hepatic hilus



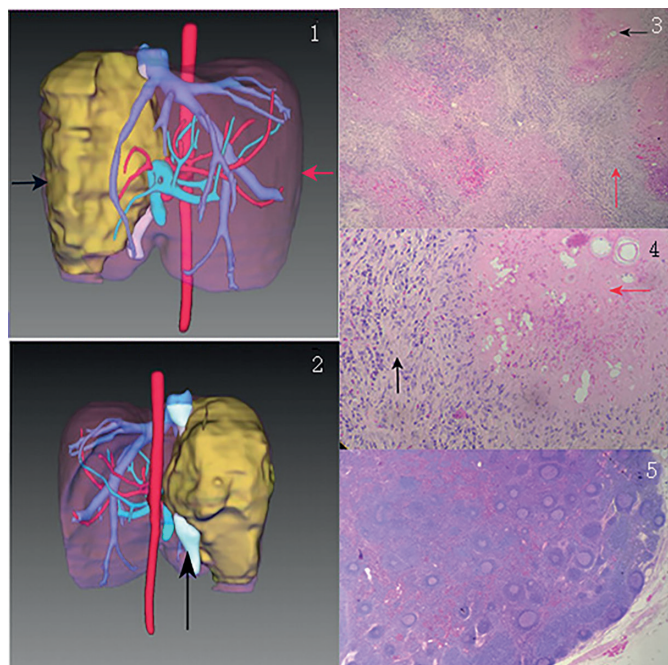
**FIGURE A:** Abdominal computed tomography/magnetic resonance imaging examination. 1234 The black arrows indicate the lesion of hepatic alveolar echinococcosis; the red arrows, the compressed retrohepatic inferior vena cava; 56 the red arrows, the obstructed inferior vena cava; and the black and white arrows, the compensatory azygos and hemi-azygos veins.

\*contributed equally to this work.

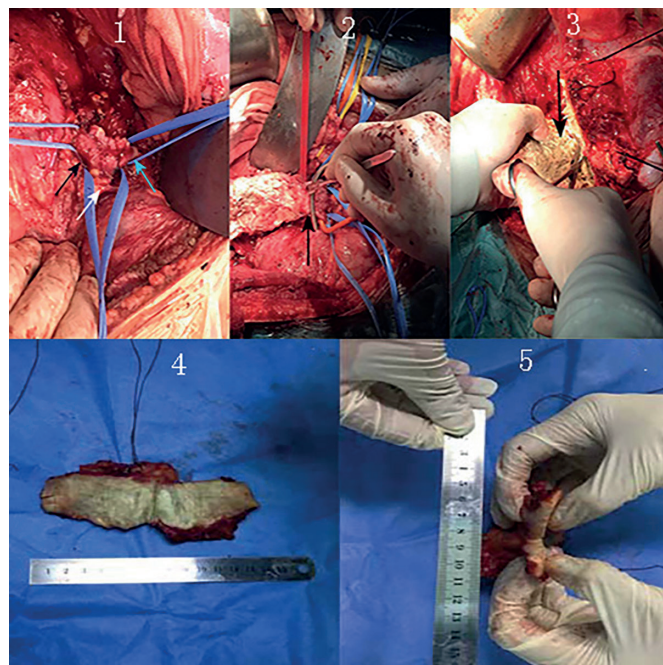
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**FIGURE B:** Three-dimensional reconstruction of the liver and virtual excision. (1) The black arrow indicates an alveolar hydatid lesion; (2) the black arrow indicates the compressed IVC. Hematoxylin and eosin staining: (3) the black and red arrows indicate the lesion and inflammatory response zone (original magnification  $\times 20$ ); (4) the red and black arrows indicate the lesion and inflammatory response zone (original magnification  $\times 100$ ); and (5) no lesions were metastasized (original magnification  $\times 20$ ).



**FIGURE C:** Surgery photographs: (1) the first porta hepatis; (2) dissection and resection of the IVC; (3) stepwise resection of the huge lesion; and (4) completely infiltrated vascular wall.

and rarely infringe the IVC. Surgery is the first-choice treatment for HAE, but radical surgery is performed only in 35% of patients, especially when the first and second hepatic portals are involved. Although combined liver and IVC resections involve a considerable risk, curative surgical resection could improve the long-term survival of patients with invaded IVCs.

#### Institutional review board statement

The study was reviewed and approved by the local ethics committee.

#### Informed consent statement

All study participants, or their legal guardian, provided informed written consent before study enrollment.

#### Conflict of Interest

The authors declare that there is no conflict of interest.

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#### REFERENCES

1. Torgerson P R, Keller K, Magnotta M, Ragland N. The global burden of alveolar echinococcosis. *PLoS Negl Trop Dis.* 2010;4(6):e722.
2. Kern P, Wen H, Sato N, Vuitton DA, Gruener B, Shao Y, et al. WHO classification of alveolar echinococcosis: principles and application. *Parasitol Int.* 2006;55(Suppl):S283-7.