Airway obstruction after trans-jugular liver biopsy: anaesthetic management

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Summary
We describe the anaesthetic management of a patient who developed life-threatening airway obstruction after trans-jugular liver biopsy. An awake tracheal intubation was performed before anaesthesia was induced and an emergency tracheostomy carried out. (Br. J. Anaesth. 1995; 75: 102–104)

Key words
Intubation tracheal. Complications, haematoma. Surgery, hepatic

Liver biopsy is the only reliable method of diagnosing intrinsic liver disease. There are many contraindications to conventional needle biopsy in patients with liver dysfunction, such as ascites, prolonged prothrombin time (> 3 s above normal) and thrombocytopenia. It is often felt that an open liver biopsy via a mini-laparotomy is safer. The trans-jugular technique of liver biopsy avoids some of the dangers of blind percutaneous needle liver biopsies and, as it can be done under local anaesthesia, avoids anaesthetic risks and postoperative morbidity associated with an open liver biopsy in those with concurrent liver disease.

Trans-jugular liver biopsies are not without complications. We report a case of life-threatening airway obstruction, secondary to a complication of trans-jugular liver biopsy. We believe that this complication has not been reported previously.

Case report
A 47-yr-old man with a history of presumed alcoholic liver disease was admitted with jaundice, passage of blood per rectum, melaena and shortness of breath. On admission his clotting was deranged. Blood results were as follows: haemoglobin 11.3 (13.5–18) g dl⁻¹, WCC 16.3 (4.0–11) × 10⁹ litre⁻¹, platelets 95 (150–400) × 10⁹ litre⁻¹, PT 22 (14–18) s and APTT 36.1 (35–45) s.

Because of his previously deranged clotting, trans-jugular liver biopsy was planned. A chest x-ray was not taken before biopsy.

In the radiology department, an uneventful trans-jugular liver biopsy was carried out. The technique consists of internal jugular vein puncture and the use of a Seldinger technique and dilators up to size 9-French gauge and the placement of an introducer for the biopsy needle, similar to that for a pulmonary artery catheter. Through the introducer, a needle guide and then a needle was passed under screening control and a core of tissue taken.

Approximately 10 h after biopsy, at 02:00, neck swelling was noted and the house-man was called who advised that pressure be applied to the neck. At this stage, the patient was supine in bed. By 09:30, a large haematoma was present over the right side of the neck which was starting to affect the patients speech and swallowing. He remained haemodynamically stable with a heart rate of 64 beat min⁻¹ and arterial pressure 110/60 mm Hg. An i.v. infusion was in progress. The on-call ENT surgeon was contacted. By 10:00 his condition had worsened and he was unable to speak and had stridor. At this point the anaesthetic team was called.

The patient was sitting up receiving 28 % oxygen via a Venturi mask. He was unable to speak and had severe inspiratory and expiratory stridor. The emergency theatre was prepared and he was given 100 % oxygen on transfer to the anaesthetic room. The ENT surgeons were in attendance.

In the anaesthetic room, the patient was monitored with an electrocardiogram, pulse oximetry and non-invasive arterial pressure. In view of the extensive swelling of the right side of the neck, the consequent airway obstruction and the reduced mouth opening (approximately 2 cm), it was considered unsafe to anaesthetize the patient before securing an airway. A

The decision was made to perform a liver biopsy. Before biopsy, the patient was given 2 u. of fresh blood and 4 u. of fresh frozen plasma. Blood results after administration of the blood products were as follows: haemoglobin 11.3 (13.5–18) g dl⁻¹, WCC 16.3 (4.0–11) × 10⁹ litre⁻¹, platelets 95 (150–400) × 10⁹ litre⁻¹, PT 22 (14–18) s and APTT 36.1 (35–45) s.

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decision was made to intubate the trachea with the patient awake using a fiberoptic laryngoscope. Because of poor mouth opening, we chose the nasal route, despite the obvious risk of epistaxis in a patient with abnormal clotting.

The interior of the nose was anaesthetized with ribbon-gauze soaked in 5% cocaine (3 ml) and the oropharynx with 10% lignocaine spray. During this period, the patient’s cardiovascular system remained stable and he had a peripheral oxygen saturation of > 95% with 100% oxygen, given via a Mapleson C circuit at 15 litre min⁻¹. After approximately 5 min, the fiberoptic laryngoscope was passed nasally (without causing epistaxis) and tracheal intubation was successful using a 6.0-mm armoured tracheal tube, despite marked tracheal shift. Placement of the tracheal tube was confirmed by capnography and auscultation and the patient was then anaesthetized with propofol 1.5 mg kg⁻¹ and fentanyl 0.7 μg kg⁻¹. Neuromuscular block was provided by atracurium 0.5 mg kg⁻¹ after ensuring that it was possible to ventilate the lungs manually.

The right side of the neck was explored surgically and after a very difficult dissection the internal jugular vein was isolated. It was not possible to stop oozing from the posterior wall of the vein and it was tied off. During the procedure, a further 4 u. of fresh frozen plasma and 6 u. of platelets were given. A tracheotomy was performed with difficulty, because of the distorted anatomy. The patient was haemodynamically stable throughout the procedure. At the end of surgery the patient was awakened uneventfully. He was nursed in the high dependency unit and given humidified oxygen via a tracheotomy mask. Unfortunately, 2 days later bleeding occurred again from around the tracheostomy site and he required admission to the intensive care unit. Two weeks later, despite maximal therapy, he died from fulminant hepatic failure.

**Discussion**

Trans-venous liver biopsy was described originally in dogs in 1964 [1] and via the internal jugular vein in humans in 1973 [2]. It is usually tolerated well, but it is associated with some potential problems. Previously published work documented the complications in a review of 1000 cases. Large haematoma at the site of puncture of the internal jugular vein occurred in 10 patients and transient dysphonia in one patient. The only serious complication reported was intra-peritoneal bleeding caused by liver capsule perforation [3].

Trans-jugular liver biopsy is often the technique of choice in patients with abnormal clotting. The risk of haemorrhage is lower with this technique compared with plugged-percutaneous liver biopsies [4]. In patients with liver failure, prothrombin time is invariably prolonged. Abnormal platelet counts and function are often seen with increased adhesion but reduced aggregation. Platelet counts are often less than 100 × 10⁹ litre⁻¹ (as in this patient). The puncture site is in the neck and therefore always visible, and if bleeding occurs it should be apparent early. Minor bleeding around the puncture site is to be expected but this should be treatable with a combination of adequate correction of clotting abnormalities with fresh frozen plasma, platelets and direct pressure to the puncture site.

This patient received fresh frozen plasma and fresh blood before biopsy. After biopsy he was nursed supine and flat; perhaps a head-up position would have reduced the bleeding. Another problem that only became apparent when the neck was explored before tracheostomy, was that there must have been at least two punctures in the internal jugular vein. It is most important, particularly in patients with clotting abnormalities, that the number of attempts to enter the vessel and also the number of actual punctures is kept to a minimum.

Ultrasonic-guided percutaneous puncture of central veins, as is possible using the small hand-held Site-Rite probe (Dymax Corp., PA, USA and Jade Medical, Reading, UK) may have been useful in this patient. This device allows sight of the lumen of the vessel and accurate positioning over the vessel by virtue of a needle guide and a marker on the screen. Thompson and colleagues reported successful insertion of subclavian vein catheters by inexperienced house officers in 92% of cases using ultrasound, compared with 44% using the conventional landmark technique. In addition, the complication rate was lower using the ultrasound technique (4%) compared with the landmark technique (41%) [5]. Its use in our patient may have avoided the posterior puncture as indentation of the vessel wall is seen when the needle enters it. In addition to the advantage of increased safety, ultrasound-guided central vein placement may be more economical in the long term (despite the initial financial outlay), as fewer disposable catheter kits are used [5] and morbidity and length of hospital stay may be reduced.

The choice of suitable anaesthetic for this patient was limited. His airway was already severely compromised as he was unable to speak and had stridor. Tracheotomy was necessary because of the expanding haematoma in his neck. Because of his clotting abnormalities, we felt that infiltration of local anaesthetic into the soft tissues of the neck was dangerous and so general anaesthesia was chosen in preference to tracheotomy under local anaesthesia. Gaseous induction of anaesthesia and avoidance of neuromuscular block would have been a reasonable approach. However, we felt that because of the massively swollen neck, maintenance of an airway would have been very difficult.

Awake intubation using the fiberoptic laryngoscope was chosen even though this is not without complications. The advantages of securing the airway before induction of anaesthesia are obvious and the nasal route was chosen for ease and speed of placement. This could be criticized as it risked epistaxis in a patient with abnormal clotting, but we felt that the advantages of the nasal route outweighed the risks.

**References**


