J Anesth (1997) 11:79

Journal of
Anesthesia

Air in the brachiocephalic vein after sternotomy

SUMIO HOKA, TETSUZO NAKAYAMA, TARO NAGATA, TAKASHI AKATA, and SHOSUKE TAKAHASHI

Department of Anesthesiology and Critical Care Medicine, Kyushu University Hospital, 3-1-1 Maida-shi, Higashi-ku, Fukuoka 812-82, Japan

Key words: brachiocephalic vein, sternotomy, air embolism

To the editor:

Venous air embolism has been reported to occur not only during neurosurgery in the sitting position [1], but also during other surgical procedures such as hepatectomy [2] and cesarean section [3]. Whenever a surgical site is above the heart, there is always a risk of air entering the venous system. We were recently reminded of this principle in a patient who underwent median sternotomy in the supine position. A 64-year-old man (height 167 cm, weight 57 kg) diagnosed as having myasthenia gravis was scheduled to undergo thymectomy. He was initially anesthetized with fentanyl and droperidol. After tracheal intubation without muscle relaxants, the anesthesia was maintained with nitrous oxide and isoflurane under mechanical ventilation. After making an incision in the skin, the sternum was spread open with an electric sternal saw and a retractor. Thereafter, the mediastinal tissue was dissected; however, we encountered air bubbles in the left brachiocephalic vein. The air bubbles were entrapped throughout the highest position of the vein overriding the aortic arch. We discontinued the nitrous oxide administration. A total amount of 2 ml of air was aspirated from the vein and no further air bubbles were observed. No reduction of end-tidal partial pressure of carbon dioxide ($Petco_2$) or hemoglobin oxygen saturation (Spo_2) was observed, and the hemodymanics remained stable throughout these events.

The observed air was considered to have entered from the veins or venules which might have opened up to the atmosphere during the sternotomy. A lateral view of the patient's chest X-ray revealed a depth of 7 cm from the sternum to the base of the right atrium. The patient was neither hypovolemic nor hyperdynamic. Even under these physiological conditions, the veins at the level of the sternum could have been exposed to the subatmospheric pressure when in a supine position. Therefore, anesthesiologists must pay attention to the possible occurrence of a venous air embolism during sternotomy in the supine position.

References

1. Orebaugh SL (1992) Venous air embolism: clinical and experimental considerations. Crit Care Med 20:1169–1177
2. Hatano Y, Murakawa M, Segawa H, Nishida Y, Mori K (1990) Venous air embolism during hepatic resection. Anesthesiology 73:1282–1285
3. Lowenwirt IP, Chi DS, Handwerker SM (1994) Nonfatal venous air embolism during cesarean section: a case report and review of the literature. Obstet Gynecol Surv 49:72–76

Address correspondence to: S. Hoka
Received for publication on June 17, 1996; accepted on August 5, 1996