The Modified Concorde Position with an Intraoperative Skew Head Rotation: Technical Note

Hiroshi TAKASUNA¹ and Yuichiro TANAKA¹

¹Department of Neurosurgery, St. Marianna University School of Medicine, Kawasaki, Kanagawa

Abstract

The Concorde position was developed to approach pineal and cerebellar lesions with a midline suboccipital craniotomy. The neutral head position is needed to divide the occipital muscles symmetrically. The patient's head is tilted to the right and the face is turned to the right for the microscopic procedure to keep the midline of the patient's head axis straight in the surgical field for comfortable and accurate surgical manipulation. However, intraoperative repositioning of the patient's head is somewhat difficult to release the holding arm of the Sugita head holder in the original method. We found that a skew head rotation by fixing the head asymmetrically in the Sugita head holder is very quick and convenient to obtain the optimal head position both for a craniotomy and a microscopic procedure.

Key words: Concorde position, Sugita head frame, intraoperative head rotation

Introduction

The Concorde position described by Kobayashi has been used widely for treating pineal and cerebellar lesions.¹ The midline suboccipital craniotomy is made with the neutral head position. The surgeon is positioned to the left or right or rostral side of the patient who is in the prone position for the craniotomy. The microscope is introduced after opening the dura mater, and the surgeon stands or sits to the left of the patient looking toward the cerebellum. The neutral head position is needed for the craniotomy to divide the occipital muscles symmetrically. Then the patient's head is tilted to the right and the face is turned to the right before introduction of the microscope. The surgeon is able to keep the midline of the patient's head axis straight without discomfort and the surgical manipulation is accurate and easy. Head rotation during the operation is possible using the Sugita head frame.² However, the release of the holding arm that connects the operating table and the head holder is required to tilt the head to the left or right. In the present study, we present the head fixation method for switching the best positions for craniotomy and microscopic procedure quickly, when operating the patient in the Concorde position using the Sugita head frame.

Materials and Methods

After induction of general anesthesia, the patient is placed in the prone position. The Sugita head holder is rotated in advance 25 degrees counterclockwise from the parietal side (Fig. 1C), and the long axis of the head holder tilted 3 cm to the right and toward the patient's shoulder (Fig. 1A, C). The head is fixed asymmetrically in the head holder with four head pins. The occipital muscles are divided while keeping the midline symmetrically in the neutral head position. The craniotomy is performed and the dura mater is opened with plenty of the surgical field for the microscopic operation. When the head holder is rotated 30 degrees clockwise, the central axis of the head is automatically tilted 15 degrees to the right. The optimal head position for intracranial microscopic manipulation is obtained quickly without releasing the holding arm of the head holder (Figs. 1, 2). The head holder is returned back to the neutral position after the microscopic procedure, and the wound is closed while maintaining the midline.

Results

Between 2011 and 2013, we operated on eight patients using this method. These patients underwent a midline suboccipital craniotomy in the Concorde position for a hemangioblastoma in the dorsal side...
Fig. 1  A, C: Photographs of the setting of the head holder to the head. View of the head fixation for the modified Concorde position. B, D: View of the head position after rotation. Solid and dotted lines indicate the axis of the patient's head. Fine dotted lines indicate the long axis of the Sugita head frame.

Fig. 2  A: The surgeon and the patient in the original Concorde position from reference 1. B: A representative case with multiple hemangioblastomas on the dorsal medulla and culmen. The surgeon's view of the patient's head before head rotation in the modified Concorde method. C: The surgeon's view after the skew rotation. D: The microscopic operative view after the skew rotation. Arrow indicates the hemangioblastoma on the medulla. RT, LT, and CH indicate right and left tonsils and the cerebellar hemisphere, respectively. Dotted line indicates the longitudinal axis of the patient's head.

Discussion

The basic principle of the head and body position in the microscopic neurosurgery is fixed to the optimal position adjusted to the surgical site and direction of approach. This fundamental positioning is also necessary for the patient’s safety and to
reduce fatigue for the surgeon. It is important to emphasize both the macroscopic handling during the craniotomy and the microscopic maneuverability. The original method of the Concorde position was described as: (1) the patient is placed in the prone position and as far to the left edge of the table as possible; (2) the patient’s head is elevated higher than the level of the heart and fixed in the Sugita head frame with the head flexed and tilted to the right; and (3) the surgeon sits to the left side of the patient. It is necessary to introduce the microscope over the patient’s back on the left side in the Concorde position. It is desirable to have a visual axis of the microscope perpendicular to the lesion. Consequently, the surgeon is forced to lean over the right of the patient. If the microscopic procedures take an extended length of time, the surgeon easily tires. Therefore, the patient’s head was rotated to the original Concorde position, so that the surgeon can assume a more natural and comfortable position.

It is possible to separate the occipital muscles in the rotated head position. However, distortion of the linea alba and occipital muscles occurs inevitably in the rotated and tilted head position. Occipital muscles without any head rotation can be divided easily and quickly, regardless of the degree of surgical experience. The occipital muscles should be sutured symmetrically to reduce the subcutaneous fluid collection.

When the microscope was introduced after the craniotomy in the neutral head position, there was formerly a need to release the holding arm of the head frame and adjust the proper position. It has also been necessary to reverse this adjustment procedure during the closure of the wound after the microscopic procedure was completed. To release the holding arm twice during the operation is troublesome, so we devised a modification to avoid this complication. We called this conversion method of the head position, “the skew head rotation” in which the head can be tilted simultaneously only by rotating the head frame. Kikuta et al. described the usefulness of the prone oblique position in the surgery for the posterior fossa lesions. Their method is comparable to ours. The patient’s left shoulder tends to interfere with surgical maneuver. It is important to avoid obstruction from contact with the patient’s shoulder and back in the Concorde position. They attempted to solve this problem by using the prone oblique position. Two advantages of our method are not requiring the patient to be in the oblique body position and the possibility of head tilt in addition to rotation. The intraprograde tilt and rotation with the Sugita head frame is its greatest advantage. In addition, because the occipitocervical space is widened by skew rotation, a much wider operative field is obtained for microscopic procedures. Special care to avoid excessive rotation is required so as not to put any strain on the patient’s neck. The rotation of the Sugita head holder offers a range of up to 36 degrees to both the left and the right. The rotation of the human cervical spine is in the range of up to 68 degrees. Because the head rotation required in this modified method is only about 30 degrees, it is safer. Nevertheless, there is individuality in the rotational range of the cervical spine, and mobility of the neck rotation should be verified before induction of anesthesia. In addition, it is important to confirm that the head is safely rotated just before draping. With the cooperation of the anesthesiologist, it is necessary to pay careful attention to the withdrawal of the tracheal intubation tube and to the electrical monitoring codes in this novel intraoperative skew head rotation. The skew head rotation should be performed under direct observation of the tracheal tube by an anesthesiologist.

Conflicts of Interest Disclosure

The authors have nothing to disclose as a Conflict of Interest (COI). Hiroshi Takasuna and Yuichiro Tanaka are members of the Japan Neurosurgical Society, and their COI statuses have been disclosed to the COI committee of the society.

References

1) Kobayashi S, Sugita K, Tanaka Y, Kyoshima K: Infratentorial approach to the pineal region in the prone position: Concorde position. Technical note. J Neurosurg 58: 141–143, 1983
2) Sugita K, Hirota T, Mizutani T, Mutsuga N, Shibuya M, Tsugane R: A newly designed multipurpose microneurosurgical head frame. Technical note. J Neurosurg 48: 656–657, 1978
3) Kikuta KI, Miyamoto S, Kataoka H, Satow T, Yamada K, Hashimoto N: Use of the prone oblique position in surgery for posterior fossa lesions. Acta Neurochir (Wien) 146: 1119–1124; discussion 1124, 2004
4) Dall’Alba PT, Sterling MM, Treleaven JM, Edwards SL, Jull GA: Cervical range of motion discriminates between asymptomatic persons and those with whiplash. Spine (Phila Pa 1976) 26: 2090–2094, 2001

Address reprint requests to: Hiroshi Takasuna, MD, PhD, Department of Neurosurgery, St. Marianna University School of Medicine, 2-16-1 Sugao, Miyamae, Kawasaki, Kanagawa 216-8511, Japan.

Hiroxneuro@marianna-u.ac.jp

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