LETTERS TO EDITOR

Lessons learnt from accidental spillage of glue between nerve and artery during microvascular decompression

Sir,

Microvascular decompression (MVD) is the most common and preferred treatment modality of neurovascular compression syndrome. After separating the vessel from the nerve, there are several techniques to prevent contact of the vessel with the nerve. One of these techniques is transposition of the artery.[1] Mobilizing the arterial segment away from its usual position transposes the artery.[1] Nowadays, the artery is glued to the skull base using glue, a teflon sling, or an aneurysm clip.[2-4] It is mostly done for a large artery such as the vertebral artery or dolichoectatic basilar artery.[3] While injecting glue, there is the possibility of glue leakage onto the facial/vestibulocochlear/trigeminal nerve or other structures. This complication has never been reported. We are reporting this complication for the first time along with its management and lessons learnt.

A 42-year old female patient, a known case of right trigeminal neuralgia [Figure 1], underwent MVD after an informed consent had been taken.

During surgery, the patient was kept in a lateral position under general anesthesia. The trigeminal nerve was approached by the suboccipital, retromastoid craniotomy. The trigeminal nerve (TN) was compressed by the superior cerebellar artery (SCA) superomedially, and by its arterial branch and the superior cerebellar vein inferiorly, and was well-demarcated on dual image videoangiography (DIVA) [Figure 2a and b]. The SCA loop was compressing the long segment of the nerve. Hence, we planned to transpose the vessel to prevent its recurrent compression.

The SCA loop was dissected free from the nerve and pushed towards the skull base [Figure 3a]. The glue was used for transposition of the SCA on the dura covering the bones of the skull base [Figure 3b]. While injecting fibrin glue, the glue leaked between the artery and the nerve and caused their firm adherence [Figures 3c-e]. A sharp dissection had to be performed to cut through the solidified glue between the SCA and nerve [Figure 3f]. The solidified glue was first cut at the root exit zone (REZ) and then the cut was extended until the Meckel's cave. The SCA was then transpositioned on the skull base dura [Figure 3g]. This time, we applied glue first on the dura and then pushed the artery at that site. Glue also caused adherence between inferior arterial vessels and the nerve. We dissected them at the REZ and the mid part of the nerve [Figure 3h]. An attempt to resect the adhesion near Meckel's cave was not undertaken due to risk of damage to the trigeminal nerve.

Under high magnification, we removed the glue from the nerve, wherever it was possible to be removed safely. After dissecting the vein, shredded Teflon patch grafts were interposed between the artery–nerve and vein–nerve [Figure 4a and b]. Rest of the surgery was completed without any difficulty.

The patient experienced complete relief in his trigeminal pain . Sutures were removed on the 10th postoperative day and there was no neuralgic pain at follow up visits of the patient.

Fibrin glue is commonly used for transposition of the vessel. It solidifies in a few seconds and forms severe adhesions

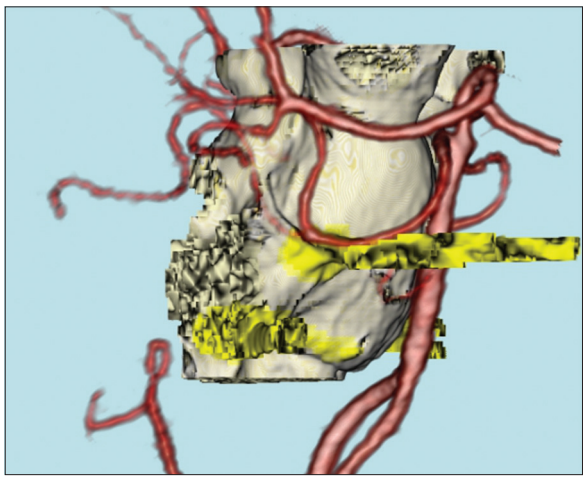

Figure 1: Fusion image [combined computed tomographic (CT) angiography and magnetic resonance constructive interference in steady state (MR-CISS)] showing the right SCA loop compressing the trigeminal nerve

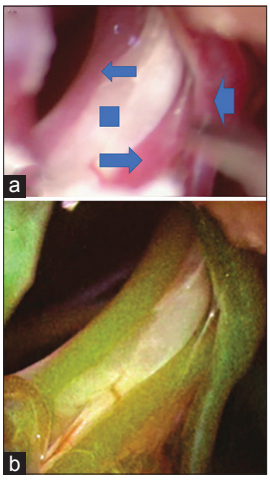

Figure 2: (a) Trigeminal nerve (square) compressed by the long segment of superior cerebellar artery (right directed arrow), its arterial branch (left directed arrow), and the vein (arrow head); (b) the same image under the DiVA (Digitalia Vetenskapliga Arkivet) sequence

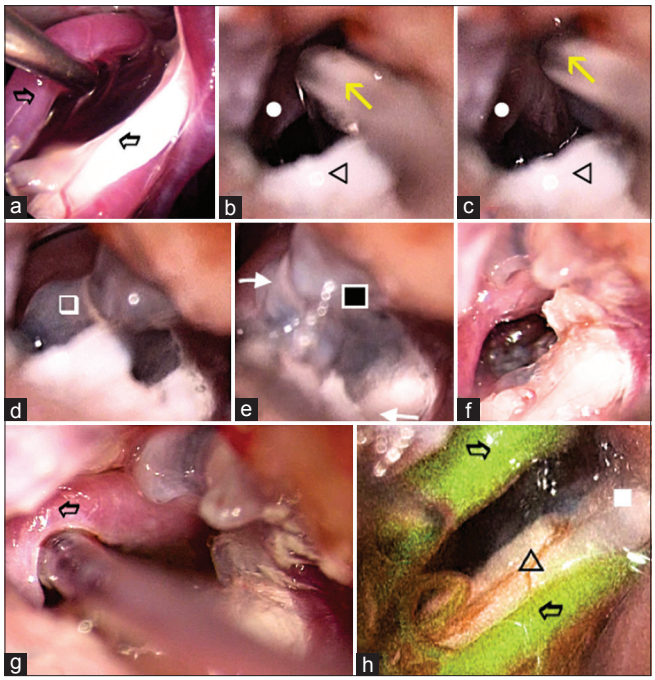

Figure 3: (a) Superior cerebellar artery (right arrow) lifted from the trigeminal nerve (left arrow); (b) injection (arrow) of glue directed to the superior cerebellar artery (white dot), which is retracted away from the trigeminal nerve (arrow head); (c) glue spilling from the injection (arrow) between the superior cerebellar artery (white dot) and the trigeminal nerve (arrow head); (d) solidified glue (square) adherent to the artery; (e) glue adherent between the artery (right directed arrow) and nerve (left directed arrow); (f) superior cerebellar artery freed from TN by resecting the mass of solidified glue; (g) transposition of the superior cerebellar artery on skull base dura; (h) DiVA image demarcating the superior cerebellar artery and the arterial branch below (arrows); they are not adherent at the REZ of TN (arrowhead)

between structures. While treating the complication, we learnt two lessons. First is how to prevent the complication from occurring! To prevent it, we suggest that glue should be first applied on the dura where the vessel needs to be fixed. Then, the vessel should be pressed on that area. After fixing the vessel, repeated applications of glue can be used to further strengthen the attachment. While applying the glue, the nerve should first be covered with small cotton pieces. This will prevent a direct accidental spillage of the glue on the nerve. Problems can occur if the glue leaks between the nerve and cottonoid. Hence, the cottonoid must be placed in such a way that the nerve is completely covered. The timing of intervention is very important in case spillage of glue occurs during surgery. Immediate action, within seconds, to wash off the spilled glue or to remove cotton pieces can prevent irreversible adhesions from taking place.

The second lesson learnt was how to treat the intraoperative spillage of glue ! To treat it, water should be poured for hydrodissection. It can remove small pieces of solidified glue. For large or densely adhered pieces, a sharp dissection with a microscissor must be done. Blunt dissection or traction can damage the nerve or artery. The nerve must be dissected from the artery at the REZ, and if it is safely possible, the dissection must extend until the Meckel's cave.

To conclude, during transposition of the vessel in MVD, glue must be used cautiously. Spillage on nerve and artery can

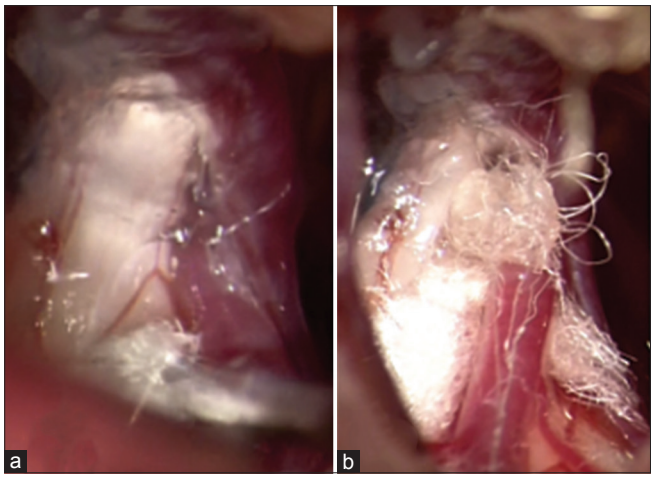

Figure 4: (a) Teflon graft placed between the inferior arterial branch and the trigeminal nerve, while the vein is looping on the artery and is adhered to the nerve by the mass of glue; (b) Teflon graft was completely separating the trigeminal nerve from the arterial branch at the root entry zone of the nerve and its mid-cisternal part; the distal cisternal part near the Meckel's cave is still having glue adherent to it

cause serious problems. Covering the nerve while using glue and injecting glue on the dura and not the vessel can prevent the adherence of the vessels to the trigmenial nerve. If there is accidental spillage, hydro-dissection and sharp dissection can minimize the damage.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

All authors certify that we have no affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

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