The morphology of the retromandibular vein in relation to the facial nerve in the parotid gland

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To avoid the complicatioins that may arise from the injury to the facial nerve in parotid surgery, the relationship between the facial nerve and the retromandibular vein was investigated. 50 dissections were performed on 30 cadavers. It was found that, in 45 (90%) of the cases the retromandibular vein was coursing on the medial side of the upper and lower trunks of facial nerve. In 5 (10%) of the cases, the course of the retromandibular vein was lateral to lower trunks and medial to upper trunks. These variations was divided into subgroups. The most commonly encountered variation was that the retromandibular vein crossed the facial nerve from its medial and lateral sides and at a point between its bifurcation and ramification of the lower trunk (75.6%, 60%). In one case the retromandibular vein was detected passing from the lateral side of facial nerve at the bifurcation. In 3 cases (15%) the course of the retromandibular vein was different on the right and left sides of the face in the same cadaver. [Turk J Med Res 1993; 112(2): 62-65]

Key Words: Facial nerve, Retromandibular vein

The course of the facial nerve in the parotid gland is important for surgeons due to possible damage to this nerve during excision of tumors from the gland (1). The relation of the retromandibular vein to the facial nerve has gained little interest in textbooks. (2,3). The aim of this study is to investigate if the retromandibular vein would be used as reference during surgical approach to the parotid gland due to its close relationship to the facial nerve and also to prevent damage to this nerve.

MATERIALS AND METHOD

The study was carried out on 30 cadavers. 50 dissections were made in the departments of Anatomy in Ondokuzmayis University, Medical School of and Hacettepe University, Medical School.

20 of the cadavers were dissected bilaterally while 4 left and 6 right facial halves were dissected unilaterally. After reflection of the skin and the superficial fascia the union of the superficial temporal and the maxillary veins within the parotid gland thus the formation of the retromandibular vein were identified. The retromandibular vein was coursed until the main trunk of the facial nerve or main branches of the main trunk were given off. The dissection was continued to identify the relationship between this vein and the inferior trunk of the facial nerve. The specimens were photographed and illustrations were drawn. The distance between the retromandibular vein and the bifurcation of the facial nerve was measured.

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RESULTS

The retromandibular vein was identified in all the specimens. 20 cases were examined bilaterally and 10 cases unilaterally. In 45 (90%) specimens the retromandibular vein coursed medial to the upper and lower trunks of the facial nerve (Figure 1 a-d); in 5 (10%) it crossed the inferior trunk laterally and the superior trunk medially (Figure 1 d-f). The maxillary and the superficial temporal veins united each other at a more superior level than that crossing. The upper and lower trunk of the nerve were closely adherent to the vein. The retromandibular vein was 5 mm. distant to the bifurcation of the facial nerve.

In 7 (15%) specimens in which the retromandibular vein crossed the facial nerve medially, the vein crossed the inferior trunk of the facial nerve at a point where the marginal mandibular and cervical branches

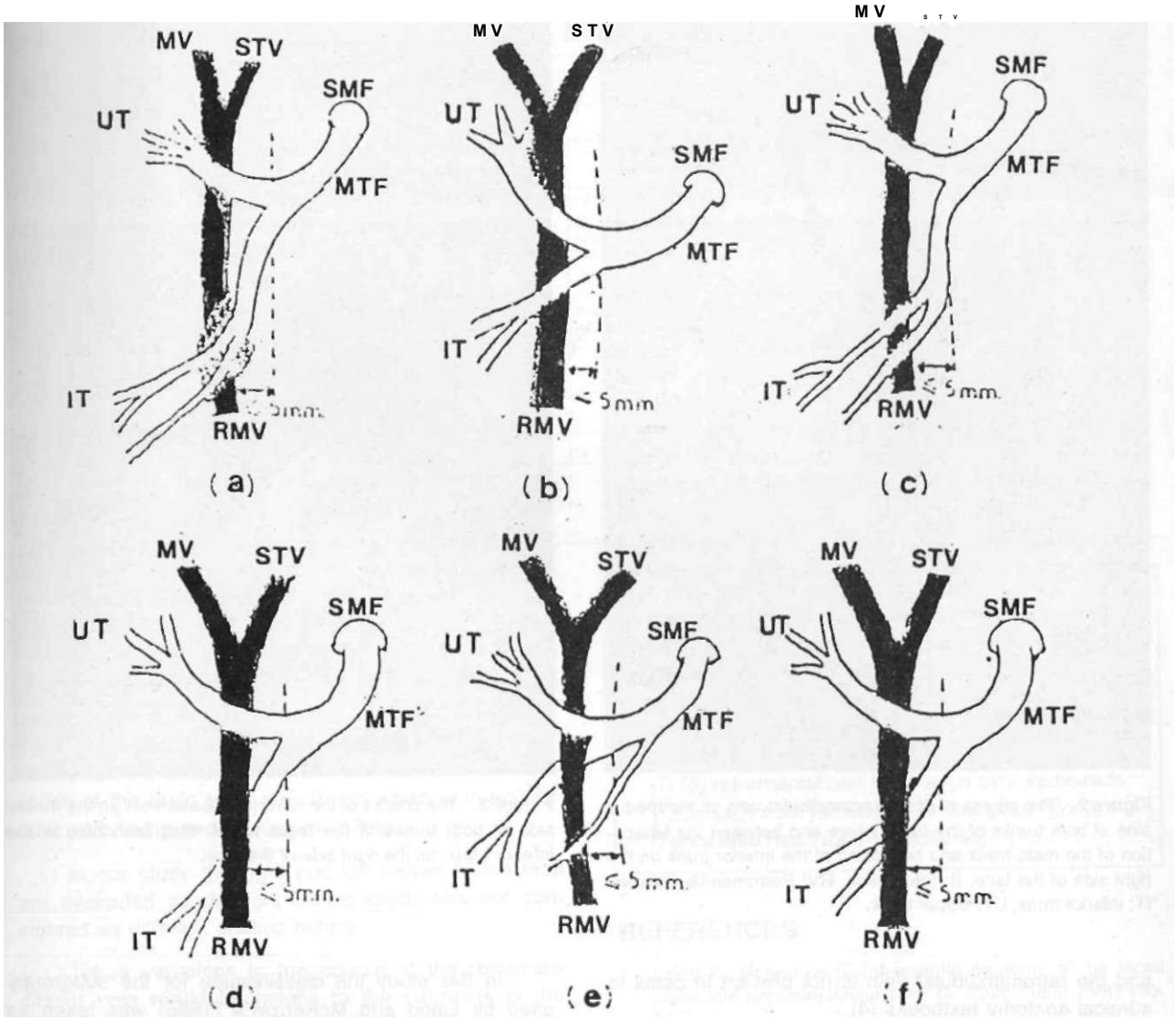

Figure 1. Types of course of the retromandibular vein in relation to the facial nerve. SmF-stylomastoid fromen, MNG-main trunk of facial nerve. STV-superficial temporal vein, MV: maxillary vein, RMV: retromandibular vein, UP: upper trunk, IT: inferior trunk (Figures a,b,d are redrawn from Laing and McKerrow).

were given off (Figure 1a); in 34 (75.6%) specimens it crossed the nerve between the bifurcation of the main trunk and the branching of the inferior trunk (Figure 1b and Figure 2) and in 4 (8.8%) specimens it crossed ihe nerve after the inferior trunk had given off its branches (Figure 1c and Figure 3).

In the group where the retromandibular vein crossed the inferior trunk of the facial nerve laterally as follows: in 8 (60%) specimens at .a place between the bifurcation of the main trunk and the branching of the inferior trunk (Figure 1d); in 1 (20%) specimen at the bifurcation of the main trunk (Figure 1e); In 1 (20%) specimen at the branching of the inferior trunk (Figure 1f).

In 3 (15%) cadavers which were bilaterally dissected the retromandibular vein crossed the facial nerve in different patterns on each side of the face. In '7 (85%) cadavers the crossing pattern was same on both facial halves.

The results in the subgroups of the variations of the retromandibular vein were not sufficient for statistical analysis. The results are tabulated in Table 1.

DISCUSSION

The risk of damage to the facial nerve during surgical procedures of the parotid gland reveals the importance of knowledge of detailed anatomy of this region (1). The exact relation of the main trunk of the facial nerve

Figure 2. The course of the retromandibular vein on the medial side of both trunks of the facial nerve and between the bifurcation of the main trunk and branching of the inferior trunk on the right side of the face. B: Bifurcation, RV: Retromandibular vein, IT: Inferior trunk, UT: Upper trunk.

Figure 3. The course of the retromandibular vein on the medial side of both trunks of the facial nerve after branching of the inferior trunk, on the right side of the face.

and the retromandibular vein is not present in detail in surgical anatomy textbooks (4).

The MRI techique puts forward the importance of the relationship between the facial nerve and the retromandibular vein but the knowledge obtained by MRI is not as reliable as the observations obtained by surgical approach (1).

In previous studies it is stated that the retromandibular vein takes place in the same plane with the facial nerve and the vein courses frequently medial to the cervical and mandibular branches of the facial nerve (5-8).

In their study including 100 cases related to the mandibular branch of the facial nerve, Dingman and Grabb (1962) stated that in 98% of these cases, the retromandibular vein coursed medial to the mandibular branch of the facial nerve and in only 2% it coursed lateral to it. Our results support this view. Additionally in the present study it is shown that there may be other variations thus certain places which would be used as reference in surgery.

In this study the classificaiton for the subgroups used by Laing and McKerrow's (1988) was taken as reference (1). That study includes 54 cases. They stated that in 48 (88.9%) cases the retromandibular vein coursed medial to both trunks of the facial nerve. Also they found that while in 11 (20.4%) of the 48 cases the vein crossed the inferior trunk where it gave off its branches, in 37 (68.5%) cases it crossed the inferior trunk at a place between the bifurcation of the main trunk and the ramification of the inferior trunk. The results of the present study support their finding. Additionally we found that in 4 (8.8%) cases the vein crossed the inferior trunk after it gave off its branches.

In 1 (1.8%) case Laing and McKerrow (-1988) found that the vein crossed the superior trunk medially and inferior trunk laterally. This variaton was also observed in the present series (5; 10%). Different from the previous data this type of course is divided into subgroups in this study (Table 1). The most interesting result of this group is that in one of the cases (20%), the vein crossed the inferior trunk at the bifurcation of

Table 1. Variations in the course of the retromandibular vein in relation to the facial nerve.

	The course of the retromandibular vein											
	On the medial side of both trunks of the facial nerve						On the medial side of the upper trunk and on the lateral side of the inferior trunk of the facial nerve						Total	
	at the branching of the inferior trunk of the facial nerve		between the bifurcation of the main trunk and branching of the inferior trunk		After branching of the inferior trunk		At the branching of the inferior trunk of the facial nerve		At the bifurcation of the main trunk		Between the bifurcation of the main trunk and the branching of the inferior trunk			
	Number of cases	%	Number of cases	%	Number of cases	%	Number of cases	%	Number of cases	%	Number of cases	%	Number of cases	%
Right half of the face	3	42.8	19	55.8	2	50.0	-	-	-	-	2	66.6	26	54.0
Left half of the face	4	57.2	15	44.2	2	50.0	1	100.0	1	100.0	1	33.4	24	46.0
Total	7	100.0	34	100.0	4	100.0	1	100.0	1	100.0	3	100.0	50	100.0

the main trunk of the facial nerve. This variation was not reported previously.

Laing and McKerrow (1988) found 5 cases (9.3%) in which the retromandibular vein crossed the upper trunk of the facial nerve laterally and inferior trunk medially. This result differs from our results. In our series the distance between the vein and the bifurcation of the main trunk was 5 mm which is in accordance with Laing and McKerrow (1988).

In our study the right and left halves of the face are evaluated as different series which was not considered as different entities before.

These variations in the course of the retromandibular vein would be helpful to the surgeons in the identification of the branches of the facial nerve especially the marginal mandibular when the main trunk of the facial nerve could not be identified by classical method.

Retromandibuler venin parotis bezinde fasial sinir ile ilişkisi

Parotis cerrahisi esnasında fasial sinir yaralanmalarından doğabilecek komplikasyonları önlemek amacıyla fasial sinir ile retromandibular ven arasındaki ilişki araştırıldı. 30 kadavra üzerinde 50 diseksiyon yapıldı. 45 vakada (%90) retromandibuler ven fasial sinirin üst ve alt gövdesinin medialinde seyretmekteydi. 5 vakada (%10), retromandibuler veri, alt gövdenin medialinde seyretmekteydi. Bu varyasyonlar iki alt gruba ayrıldı. En sık görülen varyasyon retromandibuler venin fasial siniri medial ve lateral kısımlarında ve alt gövdenin bifurkisyonu ve dallanma arasındaki bir noktada çaprazladığı durumdur (%75,6, %60). Bir vakada retromandibuler venin bifurkasyon düzeyinde fasial sinirin lateralinden geçtiği izlendi. Üç vakada (% 15) retromandibuler venir seyri aynı kadavrada yüzün sağ ve sol yarılarında farklılık gösteriyordu. [TurkJMedRes 1993; 11(2):62-65]

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