The Sphenoparietal Sinus of Breschet: Does It Exist? An Anatomic Study

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BACKGROUND AND PURPOSE: The termination of the superficial middle cerebral vein is classically assimilated to the sphenoid portion of the sphenoparietal sinus. This notion has, however, been challenged in a sometimes confusing literature. The purpose of the present study was to evaluate the actual anatomic relationship existing between the sphenoparietal sinus and the superficial middle cerebral vein.

METHODS: The cranial venous system of 15 nonfixed human specimens was evaluated by the corrosion cast technique (12 cases) and by classic anatomic dissection (three cases). Angiographic correlation was provided by use of the digital subtraction technique.

RESULTS: The parietal portion of the sphenoparietal sinus was found to correspond to the parietal portion of the anterior branch of the middle meningeal veins. The sphenoid portion of the sphenoparietal sinus was found to be an independent venous sinus coursing under the lesser sphenoid wing, the sinus of the lesser sphenoid wing, which was connected medially to the cavernous sinus and laterally to the anterior middle meningeal veins. The superficial middle cerebral vein drained into a paracavernous sinus, a laterocavernous sinus, or a cavernous sinus but was never connected to the sphenoparietal sinus. All these venous structures were demonstrated angiographically.

CONCLUSION: The sphenoparietal sinus corresponds to the artificial combination of two venous structures, the parietal portion of the anterior branch of the middle meningeal veins and a dural channel located under the lesser sphenoid wing, the sinus of the lesser sphenoid wing. The classic notion that the superficial middle cerebral vein drains into or is partially equivalent to the sphenoparietal sinus is erroneous. Our study showed these structures to be independent of each other; we found no instance in which the superficial middle cerebral vein was connected to the anterior branch of the middle meningeal veins or the sinus of the lesser sphenoid wing. The clinical implications of these anatomic findings are discussed in relation to dural arteriovenous fistulas in the region of the lesser sphenoid wing.
involved in diploic and meningeal venous drainage. This is the classic definition of the sphenoparietal sinus, which then came to be known as the sinus of Breschet (3).

The anatomic description became more complex and somewhat confusing when the notion was introduced that the superficial middle cerebral vein ended in the sphenoparietal sinus under the lesser sphenoid wing (4) or that the superficial middle cerebral vein was at least partially equivalent to the sphenoparietal sinus. This view, which can be traced back to Hédon’s monograph on the cerebral venous system published in 1888 (5), has been commonly reproduced in the radiologic, surgical, and anatomic literature. Oka et al (6) reported that the superficial middle cerebral vein could either join the sphenoparietal sinus or drain directly into the cavernous sinus. These authors also affirmed that the sphenoparietal sinus could drain into the sphenobasal or sphenopetrosal sinuses, which are better described conjointly as the paracavernous sinus, one of the well-documented drainage pathways of the superficial middle cerebral vein (7, 8). Bisaria (9) reported that the superficial middle cerebral vein terminated into the sphenoparietal sinus in 68% of cases reviewed. Wolf et al (10) reported that “in the region of the pterion, the vein [ie, superficial middle cerebral vein] enters the dura and runs along the lesser wing of the sphenoid to enter the anterior end of the cavernous sinus. The dural portion of this channel along the lesser wing is frequently referred to as the sphenoparietal sinus.” Wolf et al add, however, that “there is no significant dilution of the opaque material when the sinus [ie, sphenoparietal sinus] fills via the superficial sylvian vein [ie, superficial middle cerebral vein]”. They suggest that the sphenoparietal sinus drains exclusively into the superficial middle cerebral vein and that the term sinus of the lesser wing of the sphenoid should be preferred.

In a study on superficial middle cerebral vein termination, however, San Millán Ruiz et al (11) observed that injecting the superficial middle cerebral vein with colored gelatin was not followed by a concomitant filling of the middle meningeal veins, as would be expected following the classic description mentioned above. Their study also showed that when the superficial middle cerebral vein drained into the laterosellar region, it did not first constitute a dural venous sinus under the lesser sphenoid wing, but instead directly pierced the dura mater in the suprerior-anterior aspect of the lateral wall of the cavernous sinus (Fig 1). In rare cases in which the superficial middle cerebral vein coursed under the lesser sphenoid wing, it was attached to the dura mater overlying the sphenoid ridge yet maintained the macroscopic appearance of an arachnoid vein; that is, it did not become a venous sinus. These findings suggest that the superficial middle cerebral vein and the middle meningeal veins are not connected and that, if a dural venous sinus actually exists under the lesser sphenoid wing, it is not related to the superficial middle cerebral vein.

The purpose of the present investigation was to better characterize the relationship between the sphenoparietal sinus, the sinus of the lesser sphenoid wing, and the distal superficial middle cerebral vein and analyze their respective participation in the cerebral venous drainage. The existence of the sphenoparietal sinus as a distinct anatomic entity is discussed. The clinical implications of these anatomic findings are discussed in relation to dural arteriovenous fistulas in the region of the lesser sphenoid wing and illustrated with a case.

Methods

Corrosion Cast Study

Corrosion casts of the cranial and cerebral venous system were prepared from 12 nonfixed human specimens (eight female and four male specimens; average age at time of death, 85 years). In each case, the internal jugular veins were carefully dissected in the neck and canulated with 6-mm metallic probes. The venous system was thoroughly rinsed with a saline solution. Leakage sites were identified and ligatured. A mixture of blue methylmethacrylate (Beracryl; Troller, Fulenbach, Switzerland) and barium sulfate powder (HD 200 Plus; Lafayette, Anaheim, CA) was injected through both internal jugular veins until the angular veins became engorged. The specimens were then placed in a potassium hydroxide bath (40% solution, 40°C) until all surrounding soft and osseous tissues were dissolved.

Of the 24 injected specimen sides, five showed complete filling of the cerebral, diploic, and meningeal veins. In these five sides, the injection of the meningeal and diploic veins of the middle cranial fossa, the lesser sphenoid wing region and the pterion was optimal; that is, the venous channels could be followed from their origin to their termination. These five sides were used for precise evaluation of the skull base venous anatomy. On the other hand, the superficial middle cerebral vein was adequately injected in 21 of the 24 specimen sides. These 21 sides were used for the analysis of connections between the superficial middle cerebral vein and the sphenoparietal sinus.

Standard Anatomic Dissection

Standard anatomic dissection was performed on three nonfixed specimens (two female and one male; average age at time
of death, 82 years) after vascular injection. Blue methylmethacrylate was injected in the venous system as described above. Red methylmethacrylate was injected in the internal and external carotid territories via bilateral common carotid cannulations. The brain was removed before complete polymerization of the methylmethacrylate, with care taken to identify all the venous bridges attaching the brain to the base of the skull. The dura mater of the anterior and middle cranial fossa was dissected layer by layer to reveal any intradural vascular channel. The periosteal dural layer was then removed except for the dura surrounding the meningeal vessels coursing along the anterior and middle cranial fossae. The inner table of the sphenoid, frontal, and parietal bones was progressively removed so as to expose diploic vessels. Finally, the floor of the middle cranial fossa was resected to expose the pterygoid plexus. The three specimens (six sides) used for standard anatomic dissections showed complete filling of the cerebral, meningeal, and diploic venous systems.

**Angiographic Illustrations**

Typical angiographic appearance of the venous structures discussed in the anatomic study are presented to provide radiologic anatomy. The venous phase of routine cerebral angiograms obtained on a biplane digital subtraction angiography equipment (BN3000; Philips, Best, the Netherlands) were used.

**Clinical Case**

A 47-year-old man presented with a long history of headache when bending. There was no prior record of head trauma. The only clinical finding on examination was a pulsatile bruit upon auscultation of the right orbital region that was not subjectively perceived by the patient. MR imaging and MR angiography demonstrated a possible dural arteriovenous fistula under the sphenoid lesser wing showed a focal saccular dilatation. There is infratentorial drainage of the fistula into the anterior and lateral pontomesencephalic veins (black arrowheads). The saccular dilatation of the superficial middle cerebral vein is clearly visible (asterisk).

**Results**

**Anatomic Findings**

The following anatomic description is based on observations made of the 11 specimen sides with adequate vascular filling: five sides were prepared as corrosion casts and six sides were used for standard dissection. The major venous channels observed in the middle cranial fossa, in the lesser sphenoid wing and lateralosellar regions, and along the cranial vault in the frontoparietal region were the anterior branch of the middle meningeal veins, a dural venous sinus coursing under the lesser sphenoid wing (thereafter called sinus of the lesser sphenoid wing), and the termination of the superficial middle cerebral vein.

The anterior branch of the middle meningeal veins was composed of a sphenoid and a parietal portion. The sphenoid portion of the anterior branch of the middle meningeal veins (Figs 3A–C) crossed the floor of the middle cranial fossa from the lateral and anterior aspect of the greater sphenoid wing to the foramen ovale or spinosum, through which it joined the pterygoid plexus. This sphenoid portion was composed of two small parallel venous channels separated by the anterior branch of the middle meningeal artery. At the anterior margin of the greater sphenoid wing, the sphenoid portion entered a 3- to 10-mm-long osseous canal identified by Trolard (12) as the sphenoparietal canal. The parietal portion of the anterior branch of the middle meningeal veins (Figs 3B and 4) extended from the lateral opening of the sphenoparietal canal up to the venous lakes of the superior sagittal sinus. As it emerged from the sphenoparietal canal, the parietal portion of the anterior branch of the middle meningeal veins appeared as a single wide channel, which was larger than its two tributaries and met the
diploic vein (anteriorly and exits the skull through the supraorbital foramen (not shown here). The diploic vein of the orbital roof connects with a frontal lesser sphenoid wing (Fig 3). The middle and lateral third of the sinus of the lesser sphenoid wing received several branches:

1) a diploic vein that coursed within the orbital roof toward the orbital process of the frontal bone, to exit the skull through the supraorbital foramen into the supraorbital veins (five of 11 sides; Figs 3C and 5B);

2) a diploic vein of the greater sphenoid wing coursing craniocaudally into the pterygoid plexus (seven of 11 sides; Fig 3C);

3) an orbital vein observed once in a dissected specimen. This vein was only injected over a few millimeters, and its orbital termination could not be confirmed. Its anterolateral orientation suggested, however, that it corresponded to an ophthalmomeningeval vein (of Hyrtl) (10).

The relation between the superficial middle cerebral vein and the dura mater in the lesser sphenoid wing region could be assessed only in the dissected specimens, the corrosion casts being devoid of cranial soft and osseous tissues. Of the six dissected sides, the superficial middle cerebral vein continued as a para-cavernous sinus once (Fig 5A), as a laterocavernous sinus on three occasions (Fig 3A), or joined the cavernous sinus on two occasions (Fig 1). In three of the five sides where it drained toward the laterosellar region, either into a laterocavernous sinus, or into the cavernous sinus, the superficial middle cerebral vein pierced the dura mater of the cavernous sinus directly (Fig 1). In the two other cases, the superficial middle cerebral vein was superficially attached to the dura mater underlying the middle and medial third of the lesser sphenoid wing but kept the characteristics of an arachnoidal vein. The transition between the arachnoidal and dural components of the superficial middle cerebral vein occurred abruptly in all sides but one, in which the superficial middle cerebral vein drained into a laterocavernous sinus. The superficial middle cerebral vein never assumed the characteristics of a dural sinus. Connections between the superficial middle cerebral vein and the anterior branch of the middle meningeal veins or the sinus of the lesser sphenoid wing were not observed in these six dissected specimen sides.

Fig 3. Serial dissection of a fresh specimen.
A, Superior topographic view of the right. The brain has been removed and the bridging veins of the temporal pole, in this case a single superficial middle cerebral vein (black arrowhead), have been sectioned close to the brain surface. The superficial middle cerebral vein is attached to the dura mater overlying the lesser sphenoid wing but keeps the appearance of an arachnoidal vein. Note the different appearance between the superficial middle cerebral vein and the middle meningeal vessels (white arrowheads), the latter being embedded in the dura mater. The superficial middle cerebral vein terminates in a laterocavernous sinus (black arrows). Note that in this case the laterocavernous sinus shares both arachnoidal and dural characteristics being as translucent as the superficial middle cerebral vein but more greatly embedded in the dura matter. The lateral wall of the cavernous sinus becomes a definite dural venous sinus more posteriorly (white arrows) as it drains into the superior petrosal sinus (asterisk). ICA signifies internal carotid artery.

B, The dura mater of the middle cranial fossa and the ridge of the lesser sphenoid wing have been removed to expose the superior ophthalmic vein (SOV). The diploic vein of the orbital roof (black arrowheads) is followed anteriorly and exits the skull through the supraorbital foramen (not shown here). The diploic vein of the orbital roof connects with a frontal diploic vein (white arrows) that drains into the superior longitudinal sinus. The diploic vein of the greater sphenoid wing (black arrows) drains into the pterygoid plexus extracranially.

C, The inner bony plate of the frontal and sphenoid bones has been removed to expose diploic vessels. Part of the roof of the orbit has been removed to expose the superior ophthalmic vein (SOV). The diploic vein of the orbital roof (black arrowheads) is followed anteriorly and exits the skull through the supraorbital foramen (not shown here). The diploic vein of the orbital roof connects with a frontal diploic vein (white arrows) that drains into the superior longitudinal sinus. The diploic vein of the greater sphenoid wing (black arrows) drains into the pterygoid plexus extracranially.
The drainage of the superficial middle cerebral vein and its connections with other skull base venous channels were analyzed in the 21 corrosion cast sides that showed complete filling of the superficial middle cerebral vein. The superficial middle cerebral vein drained into the cavernous sinus in seven instances. It continued as a laterocavernous sinus in seven sides, and as a paracavernous sinus in five sides. No connections between the superficial middle cerebral vein and the anterior branch of the middle meningeal veins or the sinus of the lesser sphenoid wing were documented in these 21 corrosion cast sides.

### Angiographic Correlation

The superficial middle cerebral vein and its various drainage patterns, the sinus of the lesser sphenoid wing, and the sphenoid and parietal portions of the anterior branch of the middle meningeal veins were identified during the various venous phases of cerebral angiograms. Some examples are shown in Figure 6A–D.

### Discussion

#### Anatomy

The anterior branch of the middle meningeal veins (sphenoid portion) crosses the floor of the middle cranial fossa, from the foramen ovale or spinosum to the pterion, taking the form of two parallel venous sinuses centered by the middle meningeal artery. It then progresses cranially along the anterior margin of the parietal squama to terminate into the venous lakes of the superior sagittal sinus (parietal portion). As they course under the most lateral aspect of the lesser sphenoid wing, the anterior branch of the middle meningeal veins and its arterial counterpart are contained for a short distance within an osseous canal, the sphenoparietal canal (of Trolard), before exiting into a sulcus of the parietal squama. This has been previously reported (7, 12, 13). Before entering this osseous canal, the anterior branch of the middle meningeal veins establishes a connection with a dural

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**Fig 4.** Anterior and lateral view of the left convexity of a corrosion cast showing the parietal portion of the anterior branch of the middle meningeal veins. The dual meningeal and diploic nature of the parietal portion of the anterior branch of the middle meningeal veins is demonstrated. The anterior parietal diploic vein (black arrows) and the parietal portion of the anterior branch of the middle meningeal veins may be individualized wherever their course does not overlap. Note how diploic veins enter the venous lacunae of the superior longitudinal sinus at a right angle (white arrow). A parietotemporal diploic vein is demonstrated (white arrowheads); it drained into the middle third of the left transverse sinus.

**Fig 5.** Corrosion cast specimens illustrating the venous structures in the region of the lesser sphenoid wing.

_A, Anteroposterior view of left side of a corrosion cast showing the sinus of the lesser sphenoid wing (arrowheads), the parietal portion of the anterior branch of the middle meningeal veins (large arrow), and the sphenoid portion of the anterior branch of the middle meningeal veins (small arrows). Different branches of the superficial middle cerebral vein (double arrows) are seen behind the sinus of the lesser sphenoid wing. The superficial middle cerebral vein drains into a paracavernous sinus (large asterisk). The sinus of the lesser sphenoid wing is seen to cross over the superior ophthalmic vein (SOV). Only the dorsal aspect of the superior ophthalmic vein was filled in this side. Note the different aspects of the sphenoid and parietal portions of the anterior branch of the middle meningeal veins, in which the former offers a typical aspect of parallel meningeal channels, whereas the latter resembles a diploic vein. A diploic vein of the greater sphenoid wing (small asterisks) is seen to drain into the pterygoid plexus._

_B, Superior view of the right side of a corrosion cast in the region of the right lesser sphenoid wing, demonstrating the sinus of the lesser sphenoid wing (white arrowheads), the diploic vein of the orbital roof (asterisk; the anterior portion of this vein is not filled), and the superficial middle cerebral vein (arrows) draining into a lateral wall of a cavernous sinus (not seen). Note how the superficial middle cerebral vein and the sinus of the lesser sphenoid wing are not connected and course on different anatomic planes. The sinus of the lesser sphenoid wing typically crosses over the dorsal portion of the superior ophthalmic vein. The anterior branch of the middle meningeal veins was not filled in this side. SOV signifies superior ophthalmic vein; CS, cavernous sinus; SLS, superior longitudinal sinus._
venous sinus located under the lesser sphenoid wing, the sinus of the lesser sphenoid wing. The sinus of the lesser sphenoid wing is connected laterally with the sphenoid portion of the anterior branch of the middle meningeal veins and medially with the anterior and superior aspect of the cavernous sinus. It crosses over the superior ophthalmic vein before reaching the cavernous sinus. A similar description of the sinus of the lesser sphenoid wing was given by Trolard (12). Three tributaries of the sinus of the lesser sphenoid wing were found, usually draining into its lateral portion:

1) a diploic vein of the orbital roof. It connected anteriorly and extracranially with the supraorbital veins and sometimes laterally with frontal diploic veins that drained into the superior sagittal sinus. We found no mention of this diploic vein in the literature.

2) a diploic vein located within the greater sphenoid wing and draining into the pterygoid plexus.

3) an orbital vein corresponding to the ophthalmomeningeal vein (of Hyrtl) (10).

Connections between the superficial middle cerebral vein and the sinus of the lesser sphenoid wing or the anterior branch of the middle meningeal veins were never demonstrated in this study. All the other possible terminations of the superficial cerebral vein in the middle cranial fossa; that is, into a paracavernous sinus, a laterocavernous sinus, or a cavernous sinus were encountered (11, 14). Our data also confirm previous reports showing that, whenever the superficial middle cerebral vein drains in the lateral wall of the cavernous sinus. Only rarely is the superficial middle cerebral vein attached to the dura mater underlying the inferior aspect of the lesser sphenoid wing. In such cases it maintains the characteristics of an arachnoid vein (9, 11). In our material, the superficial middle cerebral vein never assumed the characteristics of a dural sinus.

On the basis of their angiographic observation that opacified blood from the superficial middle cerebral vein was not diluted under the lesser sphenoid wing, Wolf et al (10) suggested that the sinus of the lesser sphenoid wing exclusively drained the superficial middle cerebral vein. With this assumption, they clearly—and, we think, erroneously—assimilated the distal portion of the superficial middle cerebral vein connecting extravascularly with the supraorbital veins (black arrows). The superficial middle cerebral vein (black arrowheads) is well delineated and drains into the emissary veins of the middle cranial fossa.
related to the superficial middle cerebral vein is also supported by their different developmental origins. According to Padget (7), the middle meningeal veins arise from the primitive middle meningeal sinuses, which are lateral tributaries of the prootic sinus. The prootic sinus is also the precursor of the cavernous sinus and of the inferior petrosal sinus, both of which occupy an extradural position in the adult (15). The primitive middle meningeal sinuses develop as extra-chondrocranial vessels (around the 40-mm stage) and are involved in the vascularization of membranous bones that will form the skull vault (7). On the other hand, the superficial middle cerebral vein drains, along with the deep middle cerebral veins and the primitive tributaries of the basal vein of Rosenthal, into the primitive tentorial sinus of Padget (7). By the 60-mm ands 80-mm stages, with the development of the cerebral hemispheres and the subsequent caudal swing of the transverse sinus, the caudal end of the tentorial sinus migrates cranially and ventrally toward the junction between the sigmoid and transverse sinuses. As already noted by Padget, the final location of the tentorial sinus in the middle cranial fossa can vary from a medial to a lateral position. The adult remnant of the primitive tentorial sinus is, therefore, either incorporated to the cavernous sinus (medial position), courses within the lateral wall of the cavernous sinus (intermediate position), or remains on the floor of the middle cranial fossa as a paracavernous sinus (lateral position) (11, 14).

An interesting finding in our material was the observation that the anterior middle meningeal veins became assimilated to the anterior parietal diploic vein as they came out from the sphenoparietal canal (of Trolard) only to emerge as two distinct channels wherever their respective course did not overlap. The dual diploic and meningeal nature of the anterior branch of the middle meningeal veins has been reported by Trolard and Padget (7, 12). This phenomenon is probably related to aging. All the observations in our study are based on the cadavers of people who lived at least 80 years, on average. Diploic vessels appear postnatally concomitantly with the development of the cranial diploe and become prominent with old age (16). With age, the parietal impressions that correspond to the anterior branch of the middle meningeal veins (13) become deeper and more prominent (17, 18). Furthermore, there exist connections by way of small foramina between the parietal portion of the anterior branch of the middle meningeal veins and the parietal diploic vein (1, 12, 18). Because, with age, the anterior branch of the middle meningeal veins becomes more deeply positioned in the inner table of the skull, it seems reasonable to assume that a secondary assimilation of the parietal portion of the anterior branch of the middle meningeal veins to the underlying parietal diploic vein may ensue.

Angiographic Correlation

The parietal portion of the anterior branch of the middle meningeal veins can be identified during the late venous phase of cerebral angiography. When detectable, it is usually seen as two parallel, regular, and thin venous channels characteristic of meningeal veins, coursing from the pterion to the superior sagittal sinus. Alternatively, the parietal portion of the anterior branch of the middle meningeal veins may appear as a wide sinusous channel typical of a diploic vein.

The sphenoid portion of the anterior branch of the middle meningeal veins is uncommonly documented at routine cerebral angiography, either concomitantly to the superficial middle cerebral vein opacification, or slightly later in the venous phase. Distinction between the sphenoid portion the anterior branch of the middle meningeal veins and a paracavernous sinus or a lateral wall of a cavernous sinus on the lateral projection is based on the absence of cortical affinences from the superficial or deep middle cerebral veins.

The Sphenoparietal Sinus of Breschet

As mentioned earlier, Breschet’s atlas of the venous system remained unfinished, and we found no written description of the sphenoparietal sinus by Breschet himself (1). Trolard (13) reached the same conclusion in 1890. Cruveilhier quoted Breschet’s definition of the sphenoparietal sinus as a dural venous channel located under the lesser sphenoid wing and draining meningeal and diploic blood, but the origin of this quotation could not be confirmed (2). In several of Breschet’s original illustrations (1), a venous channel, located under the lesser sphenoid wing and apparently dural in nature, is clearly identified and labeled as a sphenoparietal sinus (Figs 7A and B). The middle meningeal veins are also illustrated, and the legend mentions their connection with the sphenoparietal sinus. Nowhere in the 42 plates of Breschet’s atlas does the superficial middle cerebral vein appear to be connected with the sphenoparietal sinus.

According to his illustrations, Breschet seems to have combined the parietal portion of the anterior branch of the middle meningeal veins with a dural sinus located under the lesser sphenoid wing, to cre-
ate a single continuous venous entity that he named the sphenoparietal sinus. We think, along with Tro- 
lard (12), that the parietal portion of Breschet’s sphen-
oparietal sinus is in fact the parietal prolongation of 
the anterior branch of the middle meningeal veins. 
The sphenoid portion of the sphenoparietal sinus, on 
the other hand, appears to be a distinct dural venous 
sinus coursing under the lesser sphenoid wing, with 
its own set of tributaries and secondary anastomoses. 
This venous structure is, in our opinion, adequately 
described by the term sinus of the lesser sphenoid wing 
proposed by Wolf et al (10).

It thus appears that the name sphenoparietal sinus 
does not describe an actual anatomic entity but rather 
corresponds to the arbitrary assimilation of two inde-
pendent meningeal vessels. Furthermore, the frequent 
and incorrect assimilation made in the anatomic, radi-
logic, and surgical literature of the so-called sphen-
oparietal sinus with the termination of the superficial 
middle cerebral vein, generates further confusion. 
For these reasons, it appears that the term sphenopari-
etal sinus should be abandoned.

Clinical Relevance

Dural arteriovenous fistulas in the region of the 
sphenoid lesser wing are rare findings; there is usually 
a history of previous head trauma or prior surgery 
(19, 20). We present a case of type IV dural arterio-
venous fistula under the lesser sphenoid wing. This 
fistula involved the superficial middle cerebral vein 
and not a sinus of the lesser sphenoid wing. Distinc-
tion between the two was possible by recognizing a re-
trograde filling into the deep and superficial cere-
bral venous system, the presence of a saccular dilata-
tion more typical of a vein than a venous sinus, and 
the demonstration of a laterocavernous sinus, which, 
when present, drains the superficial middle cerebral 
vein or the deep middle cerebral vein or both (11, 14).

Development of a dural arteriovenous fistula in a 
superficial middle cerebral vein is rendered possible 
by its occasional attachment to the dura mater over-
lying the lesser sphenoid wing. This distinction is 
clinically relevant, because cerebral venous hyperten-
sion and related complications are only likely to result 
from a high-grade fistula involving a superficial mid-
dle cerebral vein. Bitoh et al (19) reported a case of 
dural arteriovenous fistula of the sinus of the lesser 
sphenoid wing in a patient with a 3-month history of 
exophtalmia and chemosis due to venous hyperten-
sion in the superior ophthalmic vein, which necessi-
tated surgical correction. In general, however, asym-
tomatic dural arteriovenous fistulas of the sinus of the 
lesser sphenoid wing probably do not require any 
correction. This is supported by a case reported by 
Tsutsumi et al (20) of the spontaneous resolution of a 
dural arteriovenous fistula of the sinus of the lesser 
sphenoid wing that had appeared postoperatively.

Conclusion

The sphenoparietal sinus corresponds to the artifi-
cial combination of two venous structures, the pariet-
al portion of the anterior branch of the middle 
meningeal veins and a dural channel located under 
the lesser sphenoid wing, the sinus of the lesser sphen-
oid wing. The classic notion that the superficial mid-
dle cerebral vein drains into or is partially equivalent 
to the sphenoparietal sinus is erroneous. These struc-
tures are independent, and, in our study, the superficial 
middle cerebral vein was never connected to the anterior 
branch of the middle meningeal veins or the sinus of the lesser sphenoid wing. Our findings indi-
cate that the term sphenoparietal sinus would better 
be abandoned for the sake of anatomic precision and 
consistency. Knowledge of the venous anatomy in the 
region of the lesser sphenoid wing is of clinical im-
portance in the diagnosis, classification, and therapeu-
tic considerations of dural arteriovenous fistulas in 
this region.

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