The legend of Medusa with snake hair in Didymaion, in Didyma, Turkey

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Developmental venous anomalies (DVAs), also known as venous angiomas, are a well-recognized congenital malformation of small veins that drain into a larger central vein (Fig. 1) [1]. Angiographic appearance of a cluster of veins is referred to the descriptive Latin term classic “caput medusae” because the clump resembles snakes on the head of the mythological character named Gorgon Medusa (Fig. 2 and cover figure). In the past, when neurosurgeons tried to operate them, it was like to strange facial expression of Medusa because of the difficulties and bad outcome of these vascular malformations. Nowadays, there is still a controversy surrounding the natural history and significance of these unusual vein formations, but the terrible appearance of these malformations is no longer frightening for pediatric neurosurgeons as they do not need to be surgically removed, closed, or radiated owing to the high risk of postoperative deterioration caused by venous infarction and their functional importance in getting blood in and out of the brain [2, 3]. In general, most of the experts believe that these anomalies provide a useful and important blood draining

function. As a result, DVAs are considered to be benign and passive in nature even though some believe that they may contribute to other serious malformations—arteriovenous malformation and cavernoma—with high risk for stroke.

Today, there is a relief of Medusa’s head in Didyma in Turkey, which is an ancient temple to Apollo according to Greek mythology. There is no doubt that it will be useful to improve understanding of pediatric neurosurgeons about such historical symbols as a visual reminder, as did in the following tragic legend of Medusa.

Didyma in Asia Minor

Didyma, modern Didim located close to Aydın Province in the southwestern part of modern Turkey, was the most renowned religious site of ancient Ionia and the Hellenic world (Fig. 3) (<http://www.turkishculture.org/archaeology/didyma-1079.htm>). In Greek, the word “Didyma” meaning “twin,” referred to Apollo and Artemis, the Greek god and goddess who were twins; Apollo’s temple and oracle called the Didymaion was in Didyma, while Artemis’s was in Ephesus (<http://www.turkishculture.org/archaeology/didyma-1079.htm>). Even today, there are still remains of a “Sacred Road,” about 17 km long, connecting the two and there were ritual interstations, reliefs of members of the Branchidae family, and animal figures along the way (<http://www.turkishculture.org/archaeology/didyma-1079.htm>). Mycenae established a colony in this region in the sixteenth century BC, and then Lycians, Persians, Romans, and Carians in the Byzantine period (<http://www.turkishculture.org/archaeology/didyma-1079.htm>). After the defeat of Byzantium at the Battle of Malazgirt in 1086, the region was captured by Menteşe in 1280, Aydinids in 1300, and lastly, the Ottoman Empire by

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Fig. 1 **a** Digital subtraction angiography and **b** magnetic resonance angiography showing the DVA located in the left temporal lobe in a 15-year-old female. Note that there is the typical caput medusa-like appearance of the small parenchymal veins converging into one large medullary draining vein (Courtesy of Blaise V. Jones, MD from Cincinnati Children's Hospital Medical Center, Dept. of Radiology and Medical Imaging, Cincinnati, Ohio, USA)

Sultan Mehmed Çelebi in 1413 (<http://www.turkishculture.org/archaeology/didyma-1079.htm>).

Temple of Apollo in Didymaion

Didyma was an ancient temple of Apollo, which retains massive complex though ravaged by earthquakes over the centuries. In the Hellenistic world, it was one of the largest and important sanctuaries in the territory of the nearby great classical cities of Miletus and Priene. The temple's oracle played a significant role in the religious and political life in the Mediterranean world

(<http://www.ancient.eu/article/640/>). Didymaion has a giant temple platform or podium with a building area of over 5500 m² (<http://www.ancient.eu/article/640/>). A favorite feature of the temple, 109 m long and 51 m wide, is the collapsed cascade of gigantic columnar discs (Fig. 4) (<http://nl.wikipedia.orgnl.wikipedia>, <http://www.turkishculture.org/archaeology/didyma-1079.htm>). Most of the historians believe that Apollo's temple actually dates to the second millennium BC, although the earliest level of the temple found thus far dates to the end of the eighth century BC (<http://www.turkishculture.org/archaeology/didyma-1079.htm>).

Fig. 2 and cover figure Relief of a giant stone-carved Medusa head was formerly part of a frieze on the architrave of the Temple of Apollo at Didyma, possibly sculpted by Aphrodisias in the second century AD. It is approximately 1.0 m high. According to mythology, Medusa is a vain beauty who was transformed into a Gorgon—a monster with snakes for hair. “Image (s) courtesy of www.HolyLandPhotos.org” (from <http://holylandphotos.org/browse.asp?s=1,3,7,23,78&img=TWCSDD11>)

The legend of Medusa in Greek mythology

Of the three Gorgons (Stheno, Euryale, and Medusa) of classical Greek mythology, only Medusa is mortal [4] (<https://en.wikipedia.org/wiki/Gorgon>). Among Gorgons who are winged monsters, Medusa was the most famous (Fig. 2 and cover figure) [4]. Although depictions of Medusa seem to be quite ugly as did in the network of DVAs, ancient sources indicate that she was in fact a very beautiful lady.

Even, according to historian Hesiods, god of seas Poseidon abducted Medusa by disguising himself as a bird and have forced her in one of goddess Athena's temples because of Medusa's beauty causing a dizzy feeling. In fact, Athena was also furious about being challenged by Medusa's beauty and transformed Medusa's beautiful hair to serpents with the pretext of this incident in his own temple, and made her ugly as a punishment by giving her eyes a quality which would turn people she looks at to stone [4]. This is why Medusa is known to be a fearsome and ugly Gorgo. Today, when we say “I turned to stone” in a moment of fear, the entity which gives us fear is “Medusa with snake hair” (<http://blog.milliyet.com>).

Fig. 3 Map of Didyma, an ancient religious site located in southwestern Turkey. It is located at 90 km south of Ephesus. “Image (s) courtesy of www.HolyLandPhotos.org” (from <http://www.holylandphotos.org/browse.asp?s=1,3,7,23,78>)

[tr/medusa-nin-oykusu/Blog/?BlogNo=4911](http://www.tr/medusa-nin-oykusu/Blog/?BlogNo=4911), <http://www.metinsert.com/?Bid=777991>) [4].

According to a legend, when king Akrisios learned that he would be killed by his grandchild, he locked his daughter Danae and his grandchild Perseus in a chest and had them thrown to sea. Later, this chest drifted to Island Seriphos. The king of this island Polydektes fell in love with Danae at first sight and gave her son Perseus a difficult mission in order to win her over more easily. He asked Perseus to bring him Medusa’s head.

Messenger god Hermes and goddess Athena also helped Perseus in this difficult mission. Hermes said to Perseus:

“Take a magical hood, a magical bag and winged sandals. These items will make it easier for you” (<http://blog.milliyet.com.tr/medusa-nin-oykusu/Blog/?BlogNo=4911>) [4].

Fig. 4 Didymaion. The classical massive temple and ionic capitals are seen in this photograph (from <http://nl.wikipedia.org> nl.wikipedia)

Athena gave Perseus a hook-shaped sword and a shield so that he could cut Medusa’s head easily and warned him:

“You must refrain from making eye contact with the monster named Medusa. Otherwise you too will turn to stone ... You must use this shield as a mirror in order to cut her head. You must approach her by walking backwards and reflect her image onto the shield.” (<http://blog.milliyet.com.tr/medusa-nin-oykusu/Blog/?BlogNo=4911>) [4].

Perseus did exactly what Athena said and cut Medusa’s head without ever making eye contact with her. Medusa’s children with their father Poseidon, Pegasus who is a winged horse and its human twin Khysaor, are thrown out from her body (<http://www.metinsert.com/?Bid=777991>). Perseus takes away the severed head of Medusa, and then Athena peels the Medusa’s skin of the body [4].

According to ancient sources, the fact that blood from the left vessel of Medusa’s head contains a deadly poison, and blood from the right vessel is an antidote, which is strong enough to bring the dead back to life is proof that she is a miraculous creature (<http://blog.milliyet.com.tr/medusa-nin-oykusu/Blog/?BlogNo=4911>) [4].

Head of Medusa with snake hair as a popular apotropaic symbol

Medusa is usually considered as a snake-haired lady, very ugly, and frightening like angiographic appearance of DVAs and wherever she looked at would turn into stone. In the ancient times, however, relief and images of the head of Medusa were also used as a popular apotropaic symbol for protection of large structures and private places against evil forces. Nowadays, the appearance of distended and engorged veins on the anterior abdominal wall due to portal hypertension in the hepatic portal system is also referred to as “caput medusa” or “palm tree sign”,

instead of the Medusa, by the specialists in internal medicine. Whatever happens, it is likely that the awareness for mythological characters such as the Medusa will also help the neurosurgeons and internal medicine physicians -internists- better understand emotional and physical problems of their patients in clinical practice.

Compliance with ethical standards

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