

Venesection Sites on the Horse in the Veterinary Handbook of al-Nāṣirī

Vérvételi helyek a lovon al-Nāṣirī állatorvosi kézikönyvében

Dr. Kutasi Zsuzsanna PhD

ELTE BTK Sémfi Filológiai és Arab Tanszék

kutasi.zsuzsanna.orient@btk.elte.hu

Initially submitted March 15, 2020; accepted for publication April 28, 2020

Abstract

The author usually referred to as al-Nāṣirī or Ibn al-Munḍir (Abū Bakr b. Badr al-Dīn al-Munḍir al-Bayṭār ca. A.H. 709-741/ A.D. 1309-1340) composed his handbook on the diseases of horses and the treatments thereof at the request of Nāṣir al-Dīn Muḥammad b. Qalāwūn in the middle of the 14th century. Under this Mamluk sultan, he served as chief veterinarian. A 9th-century work by Ibn Ahī Ḥizām titled Kāmil al-sinā'tayn served as the basis of al-Nāṣirī's handbook. As evident from the title of the book, the author offered a summary of a wide range of themes concerning horses, beginning with their important role in the jihad, and proceeding to discussions of their breeds and of military training. He compares the equid diseases with human ones, a structure that allows him to describe their medical treatments as well. The description of venesection sites, of obvious use for practising veterinarians, is featured among the chapters on anatomical structures. The seventh chapter of the work mentions as many as 21 optional sites of bloodletting. Here the text indicates only the „silent/non-palpating blood-vessels” (*ḡayr al-ḍawārib*), a concept that I sought to identify by recourse to modern veterinary anatomical sources and by consulting the expert opinion of a distinguished professor of veterinary medicine, Dr. Ferenc Szalay (whose help I gratefully acknowledge here). In the medieval Arabic context, veins and arteries were not yet defined in a way analogous to modern definitions; in accordance with Galen's and his predecessors' philosophy, the veins were traced to the liver, and the arteries, to the heart. Veins were thought to carry blood and nutriment to the organs to nourish them, while arteries distribute the innate heat to every part of the body. Al-Nāṣirī classified the blood system as a kind of functional anatomy, in contrast to Galen's work on bloodletting, which described blood vessels according to the anatomy of the discrete body regions.

Key words: Islamic philosophy, anatomy of the horse, bloodletting, system of blood vessels, medieval Islamic veterinary medicine

Kulcsszavak: iszlám filozófia, ló anatómiája, vérvétel, érrendszer, középkori muszlim állatorvoslás

The author usually referred to as al-Nāṣirī¹ or Ibn al-Munḍir (Abū Bakr b. Badr al-Dīn al-Munḍir al-Bayṭār ca. A.H.709-741/ A.D.1309-1340) composed his handbook on the diseases of horses and the treatments thereof at the request of Nāṣir al-Dīn Muḥammad b. Qalāwūn in the middle of the 14th century. Under this Mamluk sultan, he served as chief veterinarian. A 9th-century work by Ibn Ahī Ḥizām titled Kāmil al-sinā'tayn served as the basis of al-Nāṣirī's handbook. As evident from the title of the book, the author offered a summary of a wide range of themes concerning horses, beginning with their important role in the jihad,

¹ The title 'al-Nāṣirī' was applied to both the work and its author.

and proceeding to discussions of their breeds and of military training. He compares the equid diseases with human ones, a structure that allows him to describe their medical treatments as well. The description of venesection sites, of obvious use for practising veterinarians, is featured among the chapters on anatomical structures. The seventh chapter of the work mentions as many as 21 optional sites of bloodletting. Here the text discusses only the „silent/non-palpitating blood-vessels” (*ḡayr al-ḡawārib*), whereas the blood-vessels left unmentioned are probably the arteries (*al-ḡawārib*). By comparison, another description of the possible sites of bloodletting by the contemporary author al-Ġassānī (al-Malik al-Muḡāhid ‘Alī b. Dāwūd b. Yūsuf b. ‘Umar al-Rasūlī A.H.706-764/ A.D.1306-1362) identifies 300 blood-vessels in a horse’s body, among which 62 are big veins, and adds that of these 32 are suitable for venesection. (The numbers seem to suggest that al-Ġassānī had a more profound knowledge of blood-vessels than al-Nāṣirī did, but if we scrutinise the descriptions, we will find that the supposed 32 blood-collection sites are not specified with any degree of precision. Multiple blood-vessels are summarily identified in one single location, such as 3 veins on each of the four legs (making a total of 12), without exactitude, and one vein is mentioned on the frog of each of the hoofs (i.e. one on each of the four legs).

According to ancient Greek natural philosophy and medicine, as laid out by Claudius (Clarissimus) Galen (129-161/200-216) – a system that was partially taken over by the Arabs – the arteries carry blood rather than air. The most important organ of the vascular system is the liver. The blood comes into being in that organ from the phlegm, which comes from the small intestine through the *vena portae* and which the „silent blood-vessels” carry from here to the heart. In reality the food that enters the stomach passes through the intestinal tract and leaves it in the form of residual faeces that is unusable for the body. Whatever is absorbed from the food through the intestines passes into the liver via the *v. portae*. Thus the liver receives directly whatever may have been absorbed through the venous system of the intestines. In other words, it is in fact here that food is transformed into blood.)

All silent vessels begin at the liver. The heart pushes the blood towards the periphery, and the blood returns from the periphery to the centre thanks to the heart’s suction effect. The pendulum movement of the blood column is maintained by the suction effect following the dilation of the ventricles and the large veins, thus the motor of the blood’s movement is the relaxation of the heart. The heart acts as a kind of pump, which also heats the blood as it moves.

The function of the arteries’ pulsation is to distribute the innate heat to every part of the body. The production of good blood depends on the proper amount of heat, and excess heat may lead to spoiling, excessive temperature being one of the signs of inflammation. (Brain 1986:127.)

The smaller veins reach the muscles, where the blood substances are converted into flesh or enter the intestines and become transformed into the material thereof.

These small veins end in minute passages having orifices that are normally closed to liquids. The arteries also terminate in this way. If any putrefaction of humours cause obstruction in these passages, plethos of blood will result. The treatment for a plethos of humours is evacuation, for evacuation is the opposite of plethos. (Brain 1986:126)

The choice of the particular blood vessel suitable for bloodletting depends on where plethos has occurred. As a general rule, blood should be let out as far as possible from the spot at which the blood collects in a plethos, yet on the same side. If obstruction occurs on the left side, one of the blood vessels in the left side, which belong to the spleen, should be selected. If obstruction occurs on the right side, one of the blood vessels on the right side, governed by the liver, should be opened. To this general rule Galen adds that, depending on the condition of the patient, blood can also be drawn near the affected area. For example,

incipient inflammations of the throat should be revulsed through the arm, and when the inflammation has disappeared, bloodletting through the sublingual vein is again possible.

According to Galen's description, the blood vessels on the right and left sides do not form separate systems, as in Hippocrates, but the veins run down both sides of the spine from above, and it is only the veins originating at the temples and eyes that split to the right and the left side of the body respectively. According to Hippocrates, there are two principal veins that originate from the two hemispheres of the brain, one of these running down to the liver and the other to the spleen. The blood vessel reaching the liver is the larger one, and the lower part of this vessel is called the hollow vein. This vein above the liver is connected to the heart and to the right arm, from which point it goes upwards from the right arm to the neck below the clavicle, where it becomes visible. It supplies the brain, the eyes, the ears and the nose on the right side. Under the liver, this vein passes all the way to the right foot. A much thinner vein passes through the spleen on the left side in the same way.

In contrast to this scheme, Galen holds that there are four main pairs of veins in the body. A first pair of these originates in the head and goes down on each side of the spine to supply the legs. They pass on the outside of the ankles and reach the feet. In the case of pain in the back and loins, venesection behind the knee joint or on the outer side of the ankles can be performed. The second pair of veins, the two jugular veins, which originate at the ears and run down both sides of the spine, feed the testicles and then proceed into the knees on the inside of the thighs, and eventually pass to the inside of the ankles and reach the feet. In the case of aching groin or testicular pain, bloodletting should be performed behind the knee or on the inside the ankle. The third pair of veins run from the temples and go down through the neck to the lungs, at which point their paths cross. The vein that begins on the right side supplies the spleen and the left kidney, while the other vein, which begins on the left side, nourishes the liver and the right kidney. Finally, the two veins meet again at the anus. The fourth pair of veins begins at the eyes. They go down the neck, then continue to the arms, turning back and passing to the axilla, and reaching the ribs. The right vein brings supplies to the liver, while the left vein does so to the spleen. Beyond this point both go to the genitals. The left vein being in direct contact with the spleen, it is called a splenic vein. Likewise, as the right vein is in direct contact with the liver it is referred to as the hepatic vein. (Brain 1986:137-138)

The vascular system is described in detail in Ibn Sīnā's 11th-century anatomical summary titled *al-Qānūn fi-l-ṭibb*. (This work based in part on Aristotle's natural philosophy, according to which some of the veins carry *pneuma* or air instead of blood.) For instance, Ibn Sīnā describes veins that originate in the liver. Among these veins a few pass to the bowels so as to draw the food from them, while some other veins reach the different organs to nourish them, and there are some which carry the air from the lungs. This wide functional range of the veins shows that the term „vein” covered a wider and different semantic area than its current meaning. Although this description was intended to be applicable to human anatomy, veterinarians would also adopt it and supplement it with their own specific observations.

According to this scheme, the liver draws food through the *vena portae* and delivers it to the organs through the *vena cava*. Before the *v. portae* exits the concave side of the liver, it forks into five branches within the liver. The five branches, divided into yet smaller branches, eventually reach the convex side of the liver, from where a vein proceeds to the gallbladder. The capillaries inside the liver are like the roots of a tree growing out of it. As soon as the *v. portae* leaves the liver at its concave side, it divides into 8 branches. Two branches among these are small, whereas the other six are large. One of the small branches is attached to the 'twelve-fingers bowel' (*duodenum*), which enables it to draw food from it. From there, it divides into smaller branches, one of these branches reaching the pancreas. The other small branch is divided into finer

branches at the lower part of the stomach, more precisely at the stomach gate (that is to say where there is a lower opening in the stomach), so as to take food from it. (Ibn Sīnā 1987: 1/1/84-85)

One of the other six branches runs on the surface of the stomach to nourish the outer surface of the latter. The inside of the stomach feeds on the primary food that it contains.

Another branch is directed towards the spleen to nourish it. Before reaching the spleen, it divides into branches, one of which (the most readily visible vein among those which run to the spleen) turns towards the pancreas. Then it reaches the spleen and from there a thick vein returns to the left side of the stomach, where it forks into branches to nourish it. One part of the vasculature entering the center of the spleen turns upwards, and another part downwards. The upward part leads a branch into the upper half of the spleen to feed it. The other part protrudes (becoming visible, even on the curvature of the stomach), and then divides into two parts: a branch on the left side of the stomach separates from it to feed it (i.e. the left side of the stomach). A part of it is embedded into the stomach to stimulate the sour part of the black bile to produce an excess and thus to help the movement of the stomach stimulate appetite. (Ibn Sīnā 1987:1/1/85)

Galen demonstrates that the liver is the source of nutritive power by a logical deductive reasoning. From the premises that the largest vessel is the source of blood vessels, and the largest vessel comes from the liver, he concludes that the liver must be the source of blood vessels. Since the blood vessels are the means of nutritive power, and since whatever is the source of an instrument is also the source of its effect, the liver must be the source of nutritive power. (Barnes 1991:85)

After this brief introduction, we can turn to the translation of the original text:

„Recognizing those blood vessels at which blood can be drawn² from the horse, and description of the origin of those blood vessels which are from the liver.³

As for recognizing the blood vessels from which blood can be drawn, their number is twenty-one. As to the origin of these blood vessels from the liver, these blood vessels are divided into two groups: one group is called the 'drumming blood vessels' (al-ḍawārib), also called arteries (al-šarāyīn), and the other group is the 'non-drumming blood vessels' (ḡayr al-ḍawārib).

Now we mention only those blood vessels and their connection with the liver (kabid) that we need from among the non-arterial vessels, which are the blood-collection sites (al-maḡṣūda).

I say that blood vessels suitable for bloodletting are derived from the liver and they are important so that the blood should reach through them to other parts of the body and should thereby nourish them.

² فَصَدَّ / يَفْصِدُ / فَصَدَّ / يَفْصِدُ The verb means "to take blood, to draw blood". Venesection has been used as a remedy to restore the upset balance of the body fluids in the case of symptoms such as various inflammations, fever, or problems of the nervous system, but always as a last resort only, all recommended herbal remedies having proved to be of no use.

³ According to the Galenic concept, the liver is the source of hematopoiesis, the centre of the venous system, and the source of nutritive power. The heart has only a warming role and it is the center of the arterial system. Nowadays the blood vessels are named after the direction of the blood flow through them. The arteries run out of the heart and they branch, the veins come together from the periphery and go towards the heart. In fact, the arteries deliver the nutrients to the target organs. In this text such is not the case; here the blood flows back and forth in the same vessel and the veins carry the nutrients.

First, two blood vessels begin from the liver: one originates on the concave side of the liver⁴ and is called the *vena portae* (*'irq al-bāb*). The other comes from the convex side of the liver⁵ and is called the empty vein (*vena cava*) (*al-'irq al-ağwaf*).

As far as the *vena portae* is concerned, it is divided into branches already within the liver before it exits and divides into three branches.⁶ Then most of these branches go towards the stomach (*ma'ida*)⁷ This is the only place at which the nutrients arrive from the liver, since the horse has no rumen (*al-kirš*) because it does not ruminate. Every animal that ruminates has a rumen.

As for the empty vein, it divides into two branches at the liver: one branch, the larger one, goes down the vertebral line to the last vertebra, and we will talk about that later.⁸

The other branch goes upwards,⁹ this is what we are talking about: This vein ascends up to the pericardium (*al-ğišā'*), which divides the chest into two halves and then it divides there into four branches:

⁴ The visceral surface of the liver is concave, with the *porta hepatis* (gate of the liver) in it. This is where the *vena portae* (portal vein) enters into the liver. The portal vein is formed behind the head of the pancreas by the fusion of the *v. mesenterica superior* and the *v. lienalis*. Upon reaching the gate of the liver, it usually enters into two branches. That is to say that it does not come from the liver, as al-Nāširī describes it, and he obviously was as yet unaware of the direction in which the blood moves in the bloodvessel.

⁵ The surface of the liver is convex to the thoracic cavity. A 10 to 15 cm-long section of the *v. cava caudalis* (caudal empty vein) is located on the parietal surface in a trench to the right of the median plane of the abdomen. This is why the medieval observer might suppose that the vein originates on the convex side of the liver. In fact, all blood vessels come out or enter the *porta hepatis*. The liver has a portal circulation, which means that when the vein enters the gland, it divides into capillaries like an artery and then collects and leaves it like a vein. The caudal empty vein is formed by the confluence of the two common iliac veins at the 4th and 5th lumbar vertebrae. After collecting the used blood from the hind limbs, pelvic and abdominal organs, and then taking blood from the liver, it draws blood from there. Within the liver, the *a. hepatica* (liver-nourishing artery), which also enters through the *porta hepatis*, forks into capillaries and mixes with the capillaries collected by the *v. portae*, and then coalesces into 3 to 4 large and a number of smaller hepatic veins (*vv. hepaticae*) and flows into the *v. cava caudalis*. In other words, the *v. cava caudalis* is just embedded into the liver, rather than being divided into branches in it or becoming part of it. The veins of the liver branches off into the *v. cava caudalis*, and thus it carries the blood from them to the heart.

⁶ The vein portae delivers blood from the stomach, spleen, and pancreas to the liver, passing beneath the dorsal vein. That is, the vein does not divide into three branches, but collects blood from three sites before entering the liver as one single blood vessel.

⁷ The *a. gastrica dextra* exits the hepatic artery and reaches the *pylorus* (exit or end) of the stomach at a slight curvature of the stomach, where it branches. The *a. gastroduodenalis* also originates from the hepatic artery and reaches the *pylorus* of the stomach, where it branches. A portion of the venous blood is drawn from the wall of the stomach into the artery via several smaller veins. Al-Nāširī understands the organ network of the blood vessels accurately, but the direction and the role of the blood are identified by him incorrectly.

⁸ The abdominal section of the *v. cava caudalis* (caudal empty vein) at the penultimate lumbar vertebra divides into two branches (*v. iliaca communis*). This short thick vein is a common strain of the inner and outer iliac veins: *vv. iliacae internae* (internal) and *vv. iliacae externae* (external).

⁹ The venous system consists of three parts: The veins of the head, the neck and the forelegs are collected by the *v. cava cranialis* (cranial empty vein) and delivered to the right atrium of the heart, meaning that it has no connection with the liver. The *vena azygos* (unpaired vein) starts from the 1st and 2nd lumbar vertebrae and it reaches the 3rd dorsal vertebra on the right side of the aorta, where it turns towards the abdomen and penetrates into the *v. cava cranialis*. The blood in the veins of the lower extremities and the body, as well as the blood in the portal system of the liver, is collected by the *v. cava caudalis*. The third venous system is the specific blood collection system of the liver, which will be discussed later and is linked to the *v. cava caudalis* (caudal empty vein). The upper blood collecting system (*v. cava cranialis*) was thought to belong to the ascending branch of the *v. cava caudalis* in the 14th century. Tracking a long vein at autopsy is difficult, almost impossible, so another vein, and perhaps even something other than a vein, could be identified as an artery branch toward the head.

1. One of these passes by the liver, divides into two branches at the chest, to the right and the left on both sides of the prominent parts of the breast (*al-fahdatān*).¹⁰ Here are the two blood vessels from which blood can be drawn at the chest: *al-nāḥirān*
2. The second branch passes backward on both sides of the sternum (*al-qaṣṣ*) until it reaches the abdomen around the navel (*marāq al-baṭn*). Here are two blood vessels from which blood can be drawn; they are called *al-maḥāzim*.¹¹
3. The third branch is bifurcated, goes upwards on both sides of the neck and then on the opposite side of the trachea: one of them penetrates into the flesh, not being visible (*al-wadağ al-'ābir*).¹² This is what the veterinarians call *al-'arnabī* ("rabbit-like").¹³ The other branch is the one from which blood can be drawn. (*al-wadağ al-zāhir*).¹⁴ This vessel is divided into several branches in the jaw.¹⁵ Two of these branches reach the tongue on either side: these are the blood vessels from which blood can be drawn in fever (*al-ḥarāra*), blistering of the mouth (*as-sulāq*) or staphylitis (soft palate inflammation). Their name is *al-adra'ān*.¹⁶ As for the invisible vessel (*al-wadağ al-'ābir*), *al-'arnabī*, it ascends to the ears and is divided into several visible branches.¹⁷ (You can see them in the ears.) Then it starts back down from the eyes on both sides. These are the blood vessels from which blood can be drawn. They are called *al-bāzirnakān*, but they are also known as *al-nawāzīr*.¹⁸ It is divided into many branches around the eye, one of which descends from the eye to the bridge of nose (*qaṣbat ul-'unf*), beside the cheek bone (*al-nāhiqān*). These are the vessels from which blood can be taken in *al-ramad*¹⁹, they are called *al-maḥāğīr*.²⁰

¹⁰ The brisket of the horse consists of two protrusions around the *manubrium sterni*, a cushion-like swelling on either side of the middle groove. The lateral groove contains the branches of the *v. cephalica* and the *v. cervicalis*, which may serve as bloodletting sites. *V. cephalica* is also visible above the knee on the medial half of the forearm.

¹¹ *V. thoracica superficialis*. In the case of the horse the vena protrudes through the skin on the side of the thorax. The text names two blood vessels around the navel, at "the soft part of the abdomen," as the Arabic text describes it. The word itself refers to the location of the strap. Also involved in the removal of venous blood from the abdominal wall is the *v. epigastrica cranialis superficialis* (*v. subcutanea abdominis*).

¹² *V. jugularis interna* in the horse is missing in most cases. Eventually, it passes along the laryngeal tube and eventually reaches the external jugular vein.

¹³ The vein disappears into the depths below the surface the way a rabbit digs into the soil. The rabbit digs winding tunnels with multiple exits to the surface.

¹⁴ *V. jugularis externa* (external jugular vein), which is still used most often for blood sampling and injection. It begins at the level of the second cervical vertebra, at the posterior corner of the parotid gland, at the junction of the *v. facialis* (vein of the face) and the *v. maxillaris interna* (vein of the internal jaw), and extends into the *v. cava cranialis* (cranial empty vein) in the thoracic cavity. The horse's jugular vein has a diameter of 2 to 2.5 cm and can grow up to 4 cm after being pressed down.

¹⁵ The *v. jugularis externa* collects veins in the head.

¹⁶ The *v. lingualis* or the *v. sublingualis*, which is located under the tongue and enters into the *v. linguofacialis* and finally into the *v. jugularis externa*. Al-Nāṣirī's description should be interpreted in reverse, as he could not observe the direction in which where the blood would flow through the blood vessels; he could only observe the branches. The smaller veins always come together in larger blood vessels towards the heart, in contrast, branching off is characteristic of the arteries, which go from the heart to the organs, towards the periphery. Today, intravenous injection can be given into one of the branches of the *v. profunda linguae* on the lower surface of the tongue near its edge.

¹⁷ *V. auricularis caudalis* (caudal ear vein) that accompanies an artery of similar name on the outer surface of the ear. They are clearly visible. It is still a traditional blood collection site for other animals (piglets, rabbits, etc.), but typically not so for horses.

¹⁸ *V. transversa faciei*. The vein under the eyes, visible as well as palpable from the outside.

¹⁹ *Ophthalmitis* (ophthalmia).

²⁰ *V. angularis oculi*, which starts under the eye, the *v. lateralis nasi* joins it from the side of the nose and enters into the *v. facialis* following the *crista facialis*. From there, the vein passes into the *v. linguofacialis* and finally into the *v. jugularis externa*.

4. As for the fourth branch, which is divided into branches in front of the chest, it descends to the bottom of *al-zawr*, then divides and the two branches reach all the way below the elbows. These are two short veins (*al-qaṣīrān*) from within.²¹ It is divided into several branches: the two largest of these are lower towards the knees (*al-rukbatān*) on the inside of the forearm (*al-zand al-a'lā*).²² These are the two vessels from which blood can be drawn. They are called *'irqā al-bawāṭin*, but are also known as *aṣ-ṣāfīnān*.²³ The other branches of these two veins pass from the back of the upper arm (*as-sā'id*) to the forearm (*al-zand al-a'lā*), and then reach the convex half of the cannon (*al-zand al-asfal*)²⁴, finally going to the outside of the pastern (*al-rusğ*). Here are the two vessels from which blood can be taken in the case of *al-ḥamar*.²⁵ Their names are *'irqā al-waḥṣīyyāt*.²⁶

So that was the branch of the empty vein that divides into two branches next to the liver and goes upwards.

The other branch of the empty vein forks downward after separation from the liver and then divides:

1. One branch moves towards the kidneys, by which the kidneys attract urine and send it to the testicles.
2. The other branch, which runs towards the last vertebra (and which branches at the last vertebra), is divided into three branches: one of these, the middle vessel, goes straight to the tail. This is the vessel from which blood can be drawn at the tail, and is called *al-'āğiz*.²⁷ The other two branches touch the thighs at their inner sides, one on the right and the other on the left. Their name is *bawāṭin al-riğlayn*.²⁸ Above the hocks (*al-'arāqīb*) they divide into a few branches and then continue on the outside and inside of the "two tibiae" (*azm as-sāqayn*)²⁹ until they reach the two pasterns (*rusğayn*). These are the two vessels from which blood can be drawn, Their names are *waḥṣīyyāt al-riğlayn* as we mentioned earlier.³⁰

So these are the veins of an animal, from which blood can be drawn; they are only twenty-one veins: *'irqā al-bāzirnakayn*, *'irqā al-maḥāğir*, *'irqā al-widāğayn*, *'irqā al-adra'ayn*, *'irqā al-nāḥirayn*, *'irqā aṣ-*

²¹ The *a. subclavia* extends beneath the armpits (*a. axillaris*). The total length of the *a. axillaris* is 6 to 7 cm and its diameter is 15 to 18 mm. The medial half of the shoulder joint passes under the *a. axillaris* and is 2 to 3 cm in diameter. The blood collection site is located at the continuation of the artery, at the *a. brachialis*.

²² *V. cephalica (antebrachii)* (vein of the forearm). The thick palpating vein on the internal side of the forearm, which is used today for blood sampling or injection in the case of dogs. This vein is the branch of the *v. cephalica (humerali)* extending towards the forearm, a subcutaneous vein in the lateral groove of the breast, which is located in the posterior end of the jugular sulcus near the thoracic entrance which leads to the *v. jugularis externa*. It can be followed from the lateral dorsal groove of the breast through the back of the forearm to the elbow. The connecting branch of *mediana cubiti* can be found here. This vein is one of the blood sampling sites in humans.

²³ The *v. saphena* (rose vein) is located on the hind leg, on the internal side of the lower thigh. The name may have been used at that time for the front leg also, because the placement of the bloodvessel is similar to that observable on the hind leg. Later on, at the description of the hind leg, it is not listed as a possible blood sampling site. Number two refers to the two front legs.

²⁴ The posterior half of the forearm has a blood collection site: *a. digitalis palmaris communis II*, alongside a vein of similar name.

²⁵ *laminitis*

²⁶ *A. et v. digitalis lateralis*, are located on the outer surface of the equatorial bones, they pass along the deep flexor tendon, and they reach the plantar surface of the coffin bone where they unite with each other in the *arcus terminalis*. In the shallow trenches on the outer surface of the equatorial bones, blood vessels can be felt under the skin.

²⁷ *V. caudalis mediana*. Nowadays it is not customary to take blood from horses at this spot, only from cattle.

²⁸ This outline of the true *v. saphena medialis (magna)*, (rose vein), is visible on the skin.

²⁹ In fact, this is about the cannons. *Sāq* is actually the lower thigh and the bone here is the *tibia*. The name of the cannon is *wazīf*, which is not listed here, but since the text here says that it is below the hock, it cannot be anything other than the leg. The name of the cannon is missing in some anatomical descriptions, the whole hind leg being called *sāq* instead. The cannon is called *zand* here. See Zsuzsanna Kutasi: *The Horse in the Medieval Arabic Literature*, Budapest 2012. pp. 48-57.

³⁰ *Arteria et vena digitalis lateralis*

šāfinayn, 'irqā al-maḥzimayn, 'irqā bawāṭin al-riġlayn, arba ' waḥšīyyāt fī-l-yadayn wa-l-riġlayn, 'irq al-danab.

As for the other blood vessels that do not draw blood, they are not mentioned here because we do not need them."

The blood vessels listed from which blood can be drawn are the following
(one on the right and one on the left):

'irqā al-bāzirnākayn (al-nawāzīr) – v. transversa faciei (vein under the eyes)

'irqā al-maḥāġīr – v. angularis oculi (originating in front of the eye and passing by the face)

'irqā al-widāġayn- v. jugularis externa (running in the jugular groove)

'irqā al-adra 'ayn – v. profunda linguae (located on the lower half of the tongue, near the edge)

'irqā al-nāḥīrayn – v. cephalica (located in the lateral breast groove below)

'irqā aš-šāfinayn ('irqā bawāṭin al-yadayn)- v. cephalica (antebrachii) (running along the inner edge of the forearm)

'irqā al-maḥzimayn (al-maḥāzīm) – v. thoracica superficialis (located on the side of the chest, at the border of the chest and the abdomen)

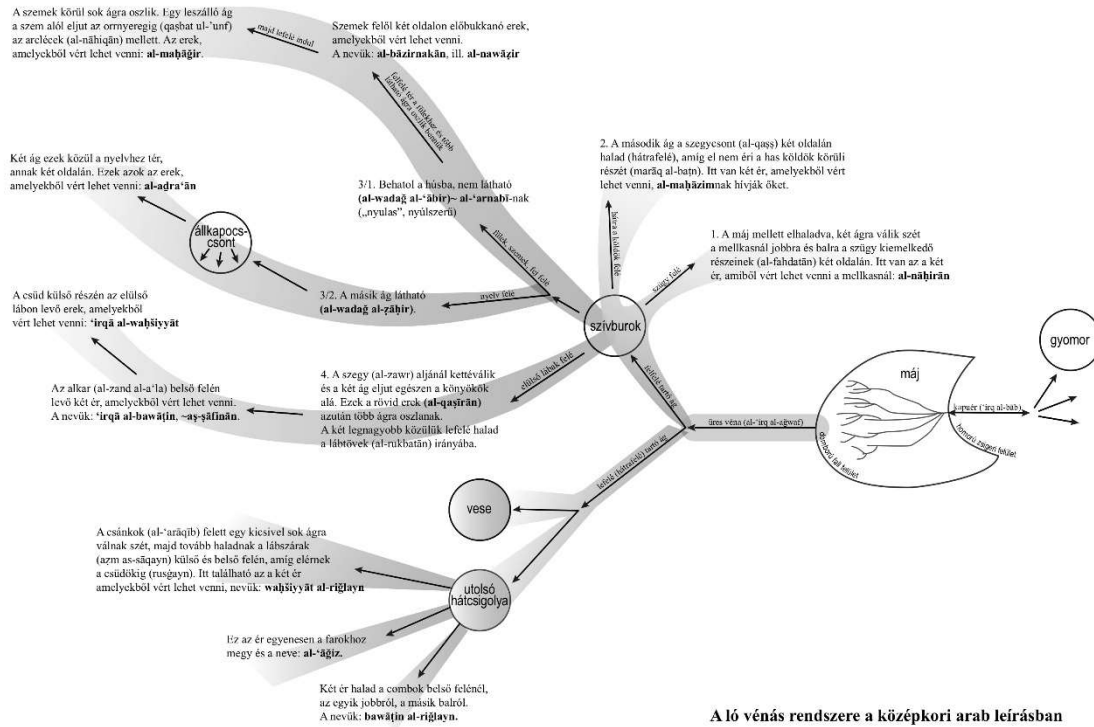
'irqā bawāṭin al-riġlayn – v. saphena medialis (magna) (visible on the inside of the thigh)

arba ' waḥšīyyāt fī-l-yadayn wa-l-riġlayn – arteria/vena digitalis lateralis (running on the outside of the cannons)

'irq al-danab (al- 'āġīz) – v. caudalis mediana (located at the bottom of the dock.)

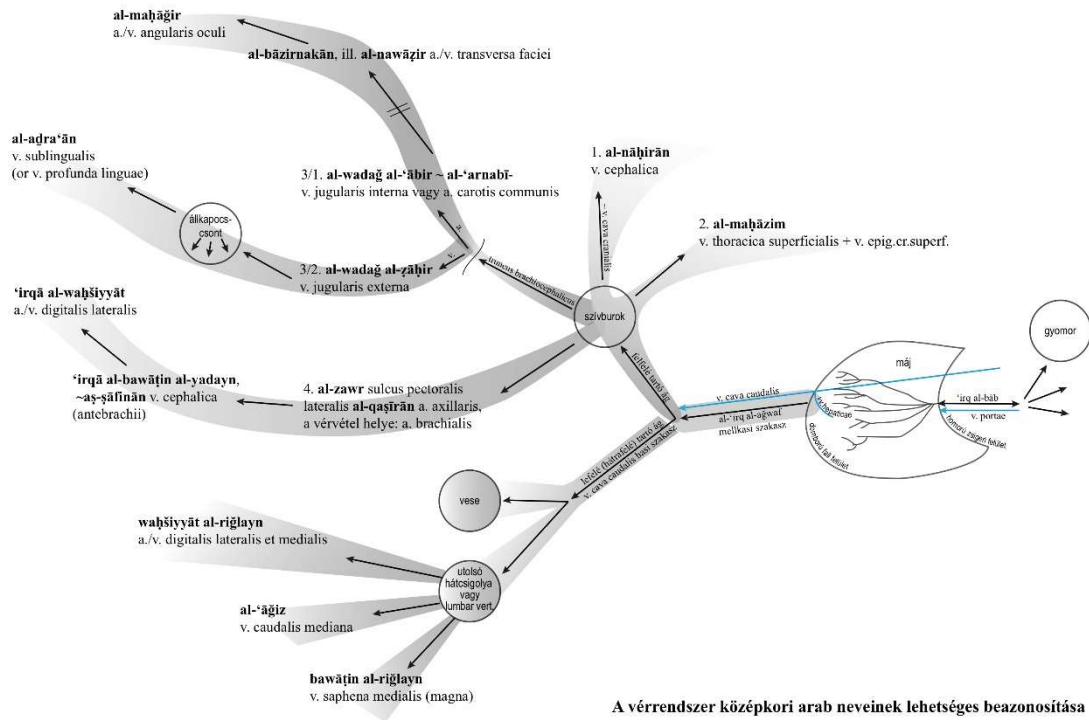
Bibliography

- BARNES, Jonathan, „Galen on Logic and Therapy” in *Galen’s Method of Healing. Proceeding of the 1982 Galen Symposium*, szerk. Fridolf KUDLIEN és Richard J. Durling, Ed.: E.J. Brill, 1991.
https://doi.org/10.1163/9789004377141_004
- BRAIN, Peter, „Galen on Bloodletting”, *Cambridge University Press*, 1986.
<https://doi.org/10.1017/CBO9780511753565>
- DR. FEHÉR György, „*A háziállatok funkcionális anatómiája*” (Budapest: Mezőgazdasági Kiadó, 2000.)
- DR. FEHÉR György, „*Háziállatok tájanatómiája*” (Budapest: Mezőgazdasági Kiadó, 1989.)
- AL-ĠASSĀNĪ, al-Malik al-Muġāhid ‘Alī b. Dāwūd b. Yūsuf b. ‘Umar al-Rasūlī, *al-Aqwāl al-Kāfiya wa-l-fuṣūl al-šāfiya fī-l-ḥayl*, (Beirut: Dār al-Ġarb al-Islāmī, n.d.)
- IBN SĪNĀ, Abū ‘Alī al-Ḥusayn b. ‘Alī, *al-Qānūn fī al-Ṭibb* (Beirut: Dār al-Fikr, 1987.)
- AL-NĀŠIRĪ, Abū Bakr b. Badr al-Dīn al-Mundīr al-Bayṭār (IBN AL-MUNDĪR), *Kāšif hamm al-wayl fī ma ‘rifat amrāḍ al-ḥayl aw kāmīl al-sinā ‘tayn al-bayṭara wa al-zarṭafa (al-zarṭaqa) al-ma ‘rūf bi-l-Nāširī*, (The veterinary medicine and the art of hippiatry. The Importance of Discovering Trouble in the Knowledge of Horse Diseases, or a Comprehensive Summary in Two Works: in the veterinary medicine and in the hippiatry.) Ed.: ‘Abd al-Raḥmān AL-DAQQĀQ, Gérard TROUPEAU, (Beirut: Dār al-Nafā’is, 1991)
- ULLMANN, Manfred, „*Islamic Medicine*” (Edinburgh: University Press 1978)

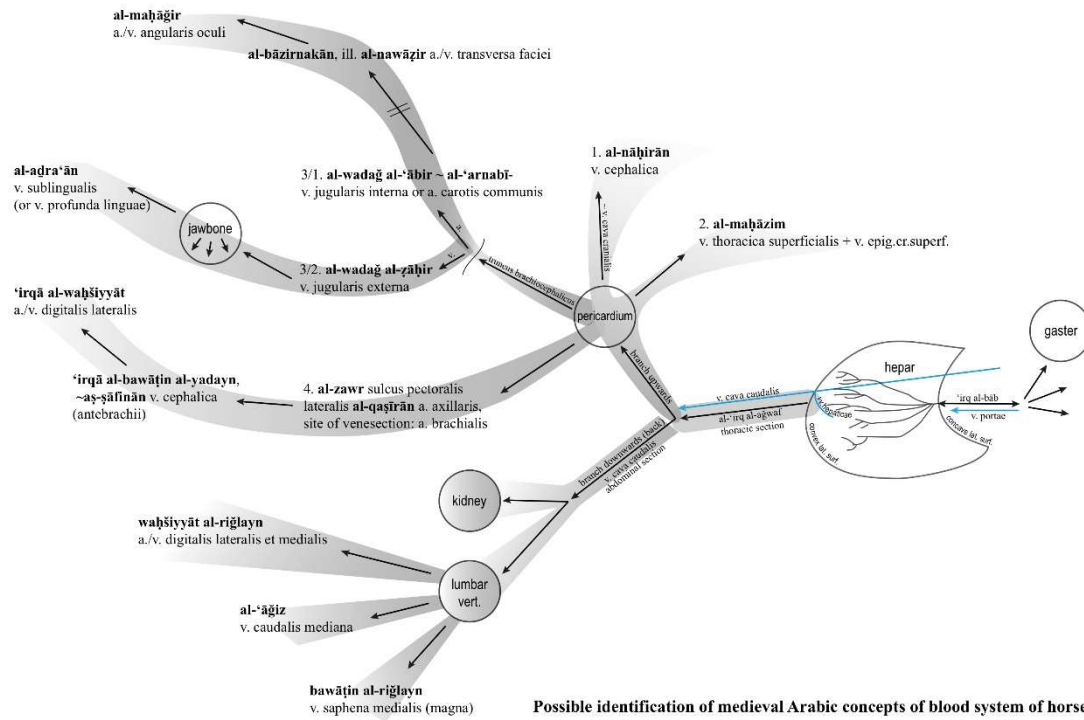


A ló vénás rendszere a középkori arab leírásban

1. The venous system of the horse in the medieval Arabic description



2. Possible identification of medieval Arabic concepts of blood system of horses



Possible identification of medieval Arabic concepts of blood system of horses

3. Possible identification of medieval Arabic concepts of blood system of horses

وما نسفح الأورين فيها يمران حتى العنق من داخل. أمدعها في اليمن والأور في اليسر. وهذا العرقان اللذان يفسد فيما يزال لها من العرقين. هذا سببا إلى عرق الوجه، عرق الأذن، عرق اللسان، عرق العنق، عرق الصدر، عرق البطن، عرق الرجلين، عرق اليد، عرق القدم.

فهذا العرقان اللذان يفسد فيما يمران حتى العنق من داخل. أمدعها في اليمن والأور في اليسر. وهذا العرقان اللذان يفسد فيما يزال لها من العرقين. هذا سببا إلى عرق الوجه، عرق الأذن، عرق اللسان، عرق العنق، عرق الصدر، عرق البطن، عرق الرجلين، عرق اليد، عرق القدم.

وإذا سافر العرقين إلى بقية هذا العرقين، فإنه لا يموت.

في معرفة ما في العروق من العروق التي يفسد فيها [في] العروق من العروق...
وإن معرفة العروق التي يفسد فيها غير البنية والحزن عرقا / أمدعها من العروق / وأمدعها من العروق التي يفسد فيها العروق من العروق...
لأنه العرقان اللذان يفسد فيما يمران حتى العنق من داخل. أمدعها في اليمن والأور في اليسر. وهذا العرقان اللذان يفسد فيما يزال لها من العرقين. هذا سببا إلى عرق الوجه، عرق الأذن، عرق اللسان، عرق العنق، عرق الصدر، عرق البطن، عرق الرجلين، عرق اليد، عرق القدم.

وما نسفح الأورين فيها يمران حتى العنق من داخل. أمدعها في اليمن والأور في اليسر. وهذا العرقان اللذان يفسد فيما يزال لها من العرقين. هذا سببا إلى عرق الوجه، عرق الأذن، عرق اللسان، عرق العنق، عرق الصدر، عرق البطن، عرق الرجلين، عرق اليد، عرق القدم.

3. Nāshīrī's description of the venous blood system of the horse