

Artery examination

This article has been translated from WikiSkripta; ready for the **editor's review**.

Arterial examination is part of the examination of the cardiovascular system. Together with the examination of the veins, it provides us with comprehensive information about the condition of the patient's blood vessels. In the outpatient clinic, we can use the anamnesis and the basic principles of physical examination (ie sight, touch, listening), especially for quick evaluation, we can also subject the patient to so-called *functional tests*. For more detailed information, the examination is then indicated using various imaging methods.

History

As part of the anamnesis, we focus on factors related to atherosclerosis both in the patient and within the family. We are especially interested in:

- disorders of lipid metabolism (hypercholesterolemia),
- diabetes mellitus ,
- hypertension ,
- vascular system disorders (CMP , infarction , thrombosis , embolization ,...),
- clotting disorders,
- smoking .
- pain in lower limb
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Symptoms

Acute disability

With acute artery occlusion by embolism (more common) or thrombus, symptoms usually progress within hours, especially in patients with poor collateral flow. 50% of those affected develop an acute ischemic syndrome characterized by:

- severe, severe pain,
- cold,
- pallor, followed by marbling and cyanosis ,
- movement, reflex and sensitivity disorders
- lack of pulsations.

We register similar symptoms in patients with limb bypass closures . Because these patients often have peripheral nerve involvement in addition to vascular involvement, ischemic syndrome may not be associated with severe pain.

- Untreated ischemic syndrome progresses to gangrene

Chronic disability [[modify](#) | [edit source](#)]

The symptoms of long-term arterial damage are diverse and are based on a narrowing to the closure of the lumen . Ischemic areas are subsequently formed behind the obstacle. A typical symptom of impaired lower limb arteries is claudication pain (*intermittent claudication*). The patient feels pinching or cramping while walking, which forces the patient to slow down or stop, which leads to pain relief within a few minutes. Manifestations are most often in the calf , which corresponds to a problem in the femoropopliteal area, the plants of the feet involving the tibial artery and dorsal pedis artery and at times in the thighs or buttocks which involves pelvic arteries and the arteries of the aortic bifurcation. The *claudication interval* is important information (section between stops), which corresponds to the distance the patient walks without pain . The interval is used as one of the stages of ischemic lower limb involvement (ICHDK). Shortening the interval, ie the distance the patient travels, is related to the worsening of the disease. The underlying symptom is ischemia . Other information such as speed of walking, slope, type of walking ground, type of footwear and whether any weight is carried is also very important to take into consideration. Other complaints can be subjective, such as a feeling of cold in the limb and increased sensitivity to cold, but also objective, such as white discolouration fingers (*digiti mortui*), changes in skin quality (eg hyperpigmentation, flaking, ulceration, etc.) or swelling.

Upper limb involvement is less common and is more typical is white discolouration of fingers than pain. Pain is more often associated with strait syndromes (carpal tunnel syndrome). Manifestations in the hand area correspond to damage to the arteries in the forearm.

A very serious situation can be a narrowing or closure of the subclavian artery before the separation of the vertebral artery . During exercise of the arm with the obstruction, blood flow is reversed, causing blood to flow from the vertebral artery to the exercising arm in order to increase the blood flow. This effects the perfusion of the brain

causing vertebro basilar insufficiency symptom (such as vertigo , fatigue, syncope.) - this syndrome is called ***subclavian steal syndrom***. Due to the specific anatomical placement of the structures in the area of the key, the first rib and the neck muscles, there may be compression of the entire nerve-vascular bundle for the upper limb. Patients tend to have variable manifestations of vascular and nervous disorders, which often worsen in connection with certain movements, such as hyperabduction.

Physical examination

Inspection of arteries

We rate:

- skin continuity,
- adnexa (hair, glands and nails),
- color,
- skin surface.

When the arteries are affected, the skin gradually atrophies , the subcutaneous fat decreases and the typical relief disappears (smoothing of the grooves above the interphalangeal joints). Hair thins out or disappears entirely, nails deform and grow slowly. Gland atrophy results in dry skin. When the patient is lying down, the affected limb tends to be paler , but when suspended, it turns red due to reactive hyperemia. Chronic blood stagnation in the capillaries can be manifested by a red cyanotic colour. If we press the place with our finger, it becomes whitish pale and after reliving the pressure the skin returns to the original red cyaotic colour. Cyanosis of the toes of the feet indicates perfusion problems due to obstruction of posterior tibial artery .Obstruction of the anterior tibial artery cause changes in the skin colour on the back of the toes. If the cyanotic colour does not disappear after pressing it usually indicates ischemia preceding the development of tissue necrosis.

You also assess skin continuity- skin surface can be damaged by abrasions, cracks or ulcers. We often find interdigital fungi infection in patients. Typical ischemic Gangrene most often begins on the fingertips, the affected extremity of kept hanging swells.

Palpation of the arteries

We rate:

- temperature,
- pulse.

By applying the dorsal side of the fingers symmetrically to both limbs, we mainly evaluate the temperature difference within the limbs. There is a palpable thrill above the larger arteries or above the arteriovenous shunt . We evaluate pulsations in the places of the respective arteries, it is good to orient according to well-palpable anatomical shapes. An intangible or weakened pulse may be associated with arterial occlusion, but also with variability in its course (a. Dorsalis pedis is absent in 8–14% of individuals).

Disappearing pulsation can be a symptom of an acute artery occlusion, which in extreme cases can lead to its loss.

Places of touch on upper extremity

Artery	A place of touch	Note
a. common carotid artery	three fingers medially from the sternocleidomastoid muscle	CAVE: Irritation of the carotid sinus can lead to bradycardia to syncope . We never compress both carotids at the same time!
subclavian artery	medioclavicularly above the collarbone	
axillary artery	middle axillary line	with the upper extremity slightly abducted
brachial artery	medial distal third of the arm between the biceps brachii and the brachialis	palpable up to the elbow socket
radial artery	medially from the processus styloideus radii on the volar surface of the forearm	
ulnar artery	compression in the wrist against the flexor carpi ulnaris tendon	
a. digital	on the sides of the fingers against the individual articles	

Artery	A place of touch	Note
femoral artery	underneath the inguinal ligament medially from the center	femoral vein is medially to the artery
popliteal artery	with both hands we embrace the knee, the thumbs joined above the patella, the other fingers below the hole	at free limb or in semiflexion
posterior tibial artery	behind the media malleolus	
dorsalis pedis artery	dorsum of the foot between II. and III. metatarsal	frequent variability of the course
fibular artery	in front of the lateral malleolus	

Auscultation of the arteries

We evaluate the presence of murmurs, which arise due to changes in blood flow from laminar to turbulent. At 60% narrowing, a vortex is audible, but at 80% narrowing, the murmur disappears. Auscultation to evaluate a. Carotid artery, a. Superficial femoral, and. Popliteal artery and abdominal course of the aorta from the lower abdomen after processus xiphoideus.

A murmur can arise as an artifact if we push the stethoscope too hard and compress the artery during the examination.

Functional test of arteries

Upper extremities

Allen's test (modified) [[edit](#) | [edit source](#)]

Informs us about the patency of the arteries distal from the wrist, including the superficial and deep volar arches.

The test procedure is as follows:

1. We will find and mark the places for palpation of a. Radialis and a. ulnaris .
2. In the places we have marked, we compress both blood vessels to prevent blood flow.
3. we elevate the patients arm, while the patient repeatedly makes a fist.
4. after the patients fingers and palm turn white, one lowers the patients hand while keeping pressure on the arteries.
5. then pressure over one artery is released
6. if the arteries and the volar arches are patent the patients fingers and palms turn red very quickly within seconds.
7. We repeat the test for the second artery.

The largest contribution to this test is the evaluation of the ulnar artery, which provides the blood supply to both the superficial and deep volar arches, but whose palpation may be difficult.

Lower extremities

Ratschow test [[modify](#) | [edit source](#)]

Both exercise and positional tests are available for evaluation of the arteries in the lower limb. The simplest is a positional test combined with exercise according to Ratschow.

We can divide it into three phases.

In the first phase:

1. The patient lying on his back raises his outstretched legs at an angle of 45-60 ° to the mat.
2. He stays in position for 30 seconds.
3. We evaluate the change in the color of the plants, which changes to white if ischemia is present.

In the second phase:

1. The patient, still in the first phase position, performs plantar and dorsal flexion as quickly as possible.
2. We measure the time that elapses before the calf pain appears and at the same time we monitor the colour of the limb.

In the third phase:

1. The patient sits on the bed and suspends his/her lower extremity over the edge.
2. Physiologically, the colour on the insteps returns within 5 seconds, the veins on the insteps (dorsal veins) fill within 10 seconds, and the legs are uniformly red within 15 seconds.

The test cannot be used in patients with chronic venous insufficiency.

Acute arterial occlusion

Sudden arterial blockage, most commonly caused by embolism then thrombosis is associated with spasm of the arteries. In 50% of the patients acute ischemic syndrome develops with sudden, very sharp pain, coldness and pallor of extremity later turning into cyanosis with disturbances in sensitivity, changes in reflex and motility, absent pulse and collapsed superficial vein. Without treatment the condition leads to gangrene.

Syndromes of the upper thoracic aperture

They represent a number of conditions characterised by intermittent compression of the nerve and vascular structure that supply the upper extremities. symptoms-

Weakness of radial pulse, a thrill on the clavicular area, changes in skin colour, and parenthesis due to compression of the subclavian artery. The symptoms can be made worse by deep inhalation. But the symptoms can be caused by some repetitive work that causes the compression eg. hyperabduction of the arm not only by vascular disease.

Scalenus syndrom - compression between the scalenus anticus and medius muscle and the 1st rib.

Costoclavicular syndrom - compression between the clavicle and the 1st rib, is provoked by military "attention position".

Hyperabduction syndrom- compression between the clavicle, the 1st rib and the small pectoral muscle. Can be provoked by hyperabduction of the arm.

Differential diagnosis

Differential diagnostics focuses on neurological history and diseases of the musculoskeletal system.

References

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