Considerations with respect to their special anatomy: missing radial artery

This information is aimed at health staff involved in the treatment of thalidomide patients with regard to the special needs arising from their special anatomy.

Thalidomide was first marketed in 1957 in West Germany under the trade-name Contergan. The German drug company Chemie Grünenthal (now Grünenthal) developed and sold the drug which was given as a sedative and treatment for morning sickness. Thalidomide became an over-the-counter drug in Germany on October 1, 1957. Shortly after the drug was sold, in Germany alone, between 5,000 and 7,000 infants were born with malformation of the limbs. Approximately 50% of these children survived. Globally, 10.000 babies were affected, half oft them to die at an early age. While thalidomide also affected inner organs, the dysplasie oft he extremities was the most striking feature.

On top of visible anatomic alterations, invisible anatomic features must be considered before certain diagnostic or therapeutic approaches are performed.

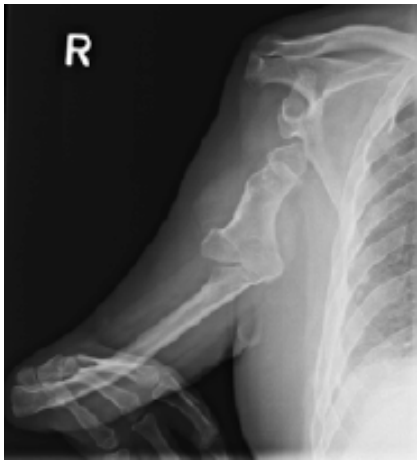
This paper deals with a missing radial artery

The radial artery normally runs distally on the anterior part of the forearm. The artery winds laterally around the wrist and joins with corresponding branches oft the ulnar artery in the deep and superficial palmar arch (anastomosis between two arteries), which ensures circulation of the hand.

Evolution is a master of efficiency, generally eradicating all superfluous tissue and it can be assumed that there is a very good reason for a redundant blood supply oft the hand.
The evolutionary idea behind an arterial anastomosis is, that in case one artery is injured, the other artery, connected by anastomosis will ensure the blood supply of the dependent region. Otherwise, injury to the radial artery would lead to loss of half the hand.

An absent radial artery is described as a (rare) variant in otherwise healthy people.

Patients with thalidomide embryopathy show a classic longitudinal damage pattern with a radial -> ulnar damage sequence, meaning that radial structures beeing damaged long before ulnar structures.



Above pictures show a classic thalidomide arm with radial aplasia (missing radius) and radial 2 fingers and consecutive radial clubbing of hand.
With severe aplasia of radial structures, a radial artery cannot be expected to exist.

As a contrary to the severe cases like in the picture above, where a missing radial artery is to be expected, initial hypothesis expected the radial artery to be intact in case of only light structural arm damage caused by thalidomide like cases where only the thenar bulge is hypoplastic.
Recent MRI Imaging of arms and hand of thalidomiders however seem to indicate that in some cases the radial artery can be affected even when there is only light structural arm damage. Several cases have been documented, where the only stigma of a thalidomide malformation consisted in a hypoplasia of the the thenar (thumb) muscles, but where MRI scans showed complete aplasia oft he radial artery. Apparently, blood vessel damage can exceed „orthopedic damage“caused by thalidomide, resulting in loss of arterial structures in an otherwise only lightly affected limb.

The clinical relevance of these findings is due to the important role the radial artery has in medical diagnostic and therapeutic approaches.

- In coronary catheterisation, the radial artery is often used as point of entry instead oft the femoral artery.
- Radial artery grafts have proven to be of superior value than venous grafts in aorto-coronar bypass surgery.
- Invasive blood pressure monitoring generally uses the radial artery as point of entry

In thalidomide patients (and due to the rare condition of a radial artery aplasia), an **Allan test**, that confirmes sufficient blood supply of the hand by two arteries, has to precede any manipulation of the radial artery.
It seems appropriate to pay special attention to the risk of an aplastic radial artery in any thalidomide victim showing even the slightest signs of upper limb deformity. Avoiding the manipulation oft the only artery supplying the hand without vital indication – like in all other patients - is imperative.