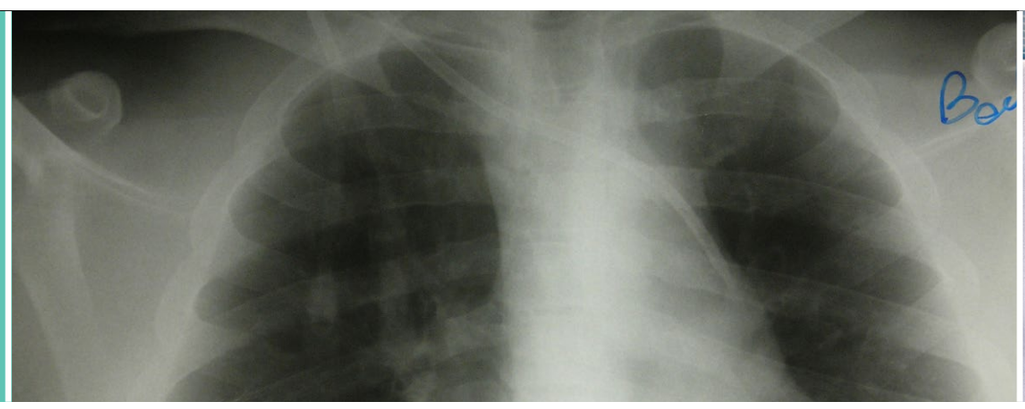

PD as ‘ultimum refugium’ because of inadequate vascular access (case study)

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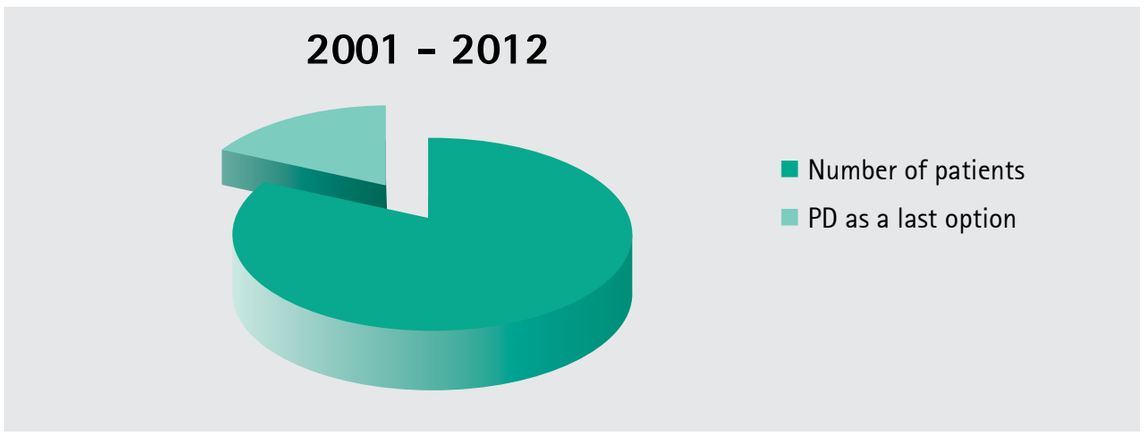
PD treatments have been taking place in our dialysis centre since 2001. By 2012, we had 86 patients, out of whom 19 had „PD as a last option”. PD as a last option refers to clinical conditions when the vascular access methods of an HD patient are exhausted, and it is no longer possible to operate a fistula/graft or insert a central vein catheter into any of the large veins. The following is an edifying case from our patient records.

L. W. is a 30-year-old non-cooperating patient with a 5000-8000 ml interdialytic weight and anuria, who has undergone multiple AVF and temporary HD cannula thromboses and refused PD on several occasions. Due to the patient's vital indications, we initiated PD treatment, with which the patient's fluid and ion balance can currently be maintained.

The patient's family anamnesis: mother had undergone cardiac surgery due to valvular and supravalvular pulmonary stenosis (later she became a HD patient as well). The same clinical condition is assumable in the case of the patient's sibling, who later also became a PD patient. The patient's anamnesis also included a 1984 pulmonary valve bifurcation and peripheral pulmonary stenosis, hypertension known and treated as of 2000, ankle surgery in 2002 and balloon dilation of valvula pulmonalis in 2003.



From 22 September, 2009, HD treatments through Cimino fistula

2 September, 2010: Operation of Cimino fistula decreased significantly.

Duplex US (2 September, 2010): Slow flow is detectable in Cimino fistula.

Angiography (6 September, 2010): The Cimino fistula originating from the radial artery is occluded in a short section, venous refill is detectable at the arteria cubitalis region from the arteria ulnaris. The occlusion was cannulated with a guide wire and dilated with a 4X40 mm balloon catheter and balloon catheter on the venous branch. Due to a 90% restenosis, stent was inserted and dilated at various levels.

On 28 September, 2010, HD treatment was conducted again.

- Patient's admission: in July 2007; symptoms: toxic uraemia. Abdominal ultrasound examination showed renal chirrosis bilaterally.
- On 17 August, 2007, after the cannulation of the right vena subclavia, the patient entered the HD program.. Due to canulla thrombosis, on 5 Sepetember, 2007, the cannulation of the left vena subclavia occured.
- On 14 September, 2007, Cimino fistula was created on the lower left arm. First treatment on Cimino fistula: 23 October, 2007.
- 3 September, 2009: on lower left arm Cimino fistula is thrombosed marked on the skin. In this region, no flow is detectable.
- Angiography (10 September, 2009): Arterial fill of upper left arm is well-paced. At the radius distalis, Cimino fistula is visible indicating a well-paced flow. At the more proximal region, the lumen is filled by a thrombus corresponding to the two venous aneurysms. Despite this, the fistula finds a collateral vein which conducts well centrally.
- As of 5 September, 2009, treatment: through temporary left vena jugularis cannula.
- 11 June, 2011: Patient's fistula does not work properly.
- 12 June, 2011: Large vein catheterisation is unsuccessful (right vena subclavia).
- Chest X-Ray: The end of the dialysis cannula inserted on the right side can be seen on the left side in the projection of the aortic arch. During X-ray, the cannula is imaged outside the aortic arch showing a synchronised movement with adopted pulsation. The administered contrast agent is diluted almost immediately in the large blood-vessel with a synchronised movement with the pulsation of the heart.

Acut PD (cycler)			HD		Acut PD (cycler)	CAPD			
2011.05.18	2011.05.24	2011.05.25	2011.06.06	2011.06.21	2011.06.24	2011.07.27	2011.10.05.	2012.02.22.	2012.03.28.
start of ADP	Insufficien out-flow - abdominal X-ray Dysposition of PD catheter	new temporary CVC - Left Femoral Vein	Tenckhoff catheter replacement	Thrombosis of Left Femoral and Popliteal Vein, ES infection of CVC	start of ADP	start of CADP	Hemodynamic exam I. - valvular dilatation is necessary	Hemodynamic exam II. dilataion and stent of valv. pulmonalis	Angiosurgery exam - HD is not recommended because of his hemodynamic status

Chest CT: The post contrast agent examination is aimed at determining the position of the cannula inserted on the right side in the vena subclavia region which can be followed in the frontal mediastinum towards the left side, then in the lumen of the left vena subclavia, (atypical) and it is discernible beside the aortic arch. The cannula ends here. In the early phase, the contrast agent administered on low pressure is imaged in the pulmonary arteries, mainly in the regions of the left coronary artery and the lower lobe branch. In the regular region on the right side, the vena cava superior is not distinct. In its region a quite gracile vein is imaged.

Opinion: After the former thrombosis of vena cava superior, the subclavian veins lead directly to the right heart through atypical veins or to the right pulmonary artery via shunt formation.

On 6 June 2011, Tenckhoff catheter was replaced.

From 24 June 2011: APD treatment. Treatment parameters: treatment time: 20 hours, later 15 hours; total volume: 15000 ml with 2,27% solution; filling volume: 1500-1700 ml; number of cycles: 9-10; average dwell time: 1 hour – 1hour 40 minutes.

From 27 July, 2011: CAPD treatment. Specifications of solution change: with Dianeal 2000 ml 2,27%-3,86%-3,86%-3,86% Extraneal solution; in order to increase efficiency the prescriptions later changed to 5X3,86% solution.

17 May, 2011: Tenckhoff catheter insertion

From 18 May 2011 with acute automatic PD. Treatment parameters: treatment time: 24 hours, total volume: 15000 ml with 2,27% solution. Filling volume: 750 ml, number of cycles: 22. Average dwell time: 40 minutes.

Insufficient drainage was observed on 24 May, 2011. The Tenckhoff catheter was shown under the liver on native abdominal X-Ray.

Due to high retention values, on 25 May, 2011, a temporary left side femoral canulla was inserted. Further HD treatments entailed left femoral vein and popliteal vein thromboses as complications including the infection of the exit site of the cannula.

Result of the hemodynamic analysis conducted on 5 October, 2011: Former echocardiography showed dilated right auricle and infundibular pulmonary stenosis at valve level. Invasive examination confirmed moderate pulmonary valve stenosis and medium pulmonary valve deficiency as well as significant stenosis of the left coronary artery and upper right artery pulmonary branch.

HD treatment would be necessary as soon as possible. For the creation of a new Cimino fistula and the admission of the patient to the kidney transplantation list, a repeated balloon dilation of the pulmonary valve would be necessary (which took place without any complication on 22 February, 2012).

28 March, 2012: Consultation regarding the creation of the AVF. Vascualr surgeon's opinion: The load on the right heart is significant (the previously 82 Hgmm pulmonary pressure decreased to 54 Hgmm), the extra praeload caused by HD could further intensify this. Our aim is to maintain the patient's euvolemia until successful transplantation.

If we had succeeded earlier in convincing the patient to change to PD, he could have avoided several cannulations with complications. We need to find more efficient methods to avoid such cases in the future.

On 13 May 2013 he was hospitalised in Neurological Department due to right side hemiparesis, where he exited on account of circulatory and respiratory insufficiencies on 17 May 2013.

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