

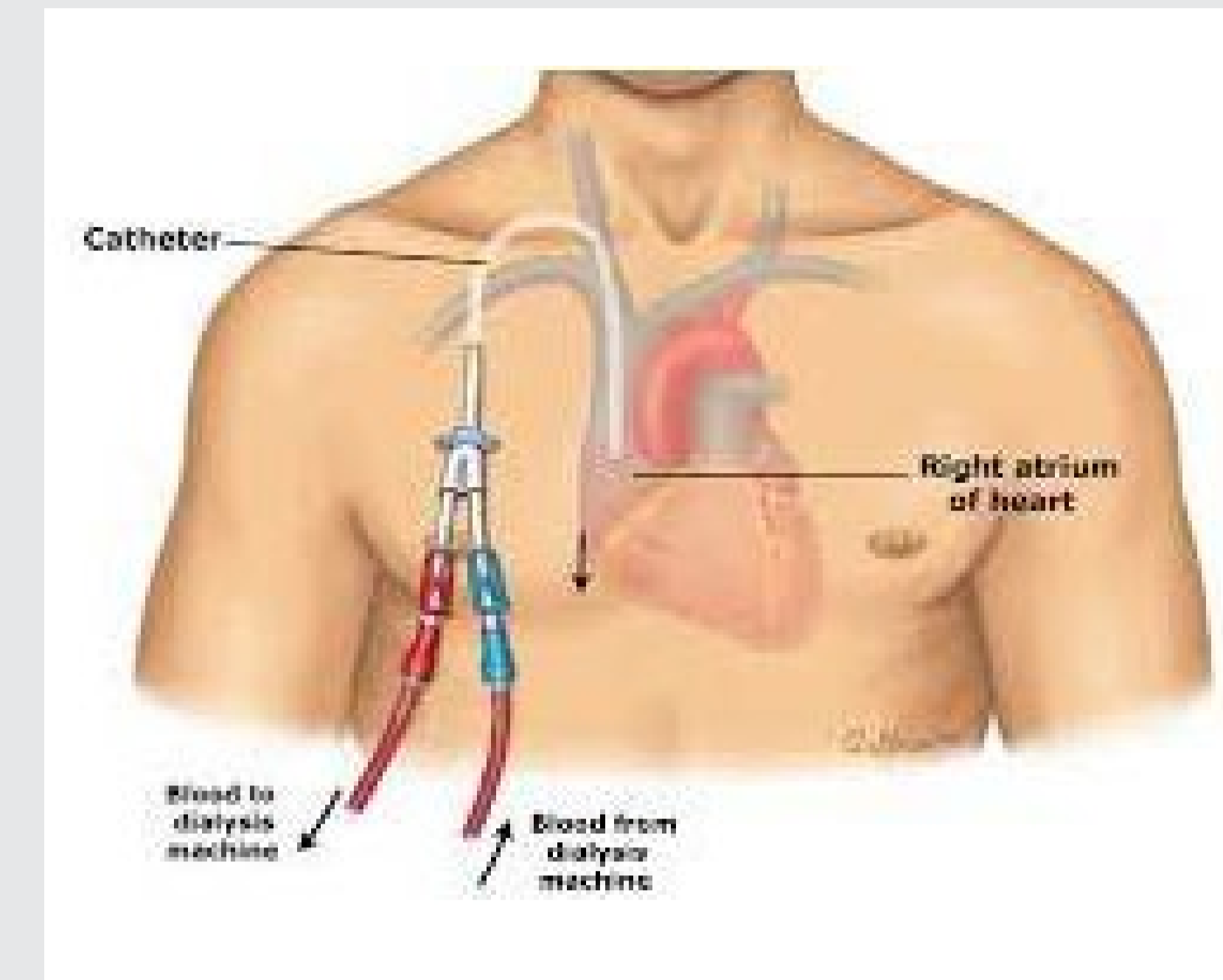
EXPERIENCES WITH A TUNNELED PERMANENT CENTRAL VENOUS CATHETER IN OUR HAEMODIALYSIS PATIENTS (2007–2015)

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INTRODUCTION

- The optimal vascular access for chronic haemodialysis (HD) is the arteriovenous fistula (AVF). There is not always sufficient time for creating an AVF, and thus the patient arrives for dialysis therapy without having a vascular access.
- Our patients drawn into the survey are increasingly old and they have spent an average of four years in renal replacement therapy by the year of the observation. Thus, if the possibilities for creating an AVF are exhausted, a temporary or permanent solution may be provided by the use of tunneled permanent central venous catheters (PC).
- From March 2007 to December 2015, we performed 310 permanent cannula implantations in 217 patients in our Centre.
- Initially we performed the PC placements exclusively with the help of image amplification devices, while since 2015 ultrasonography has also been available for us to facilitate puncture of the vein.



PATIENTS, METHOD

Between 2007 and 2015, we performed 310 PC implantations in 217 patients in our Centre. In 43 patients the PC was the primary access, while in 174 cases the patient had already received treatment in a peritoneal dialysis (PD) or haemodialysis (HD) program [through an arteriovenous fistula (AVF)].

8. Average age, gender distribution and survival of the patients

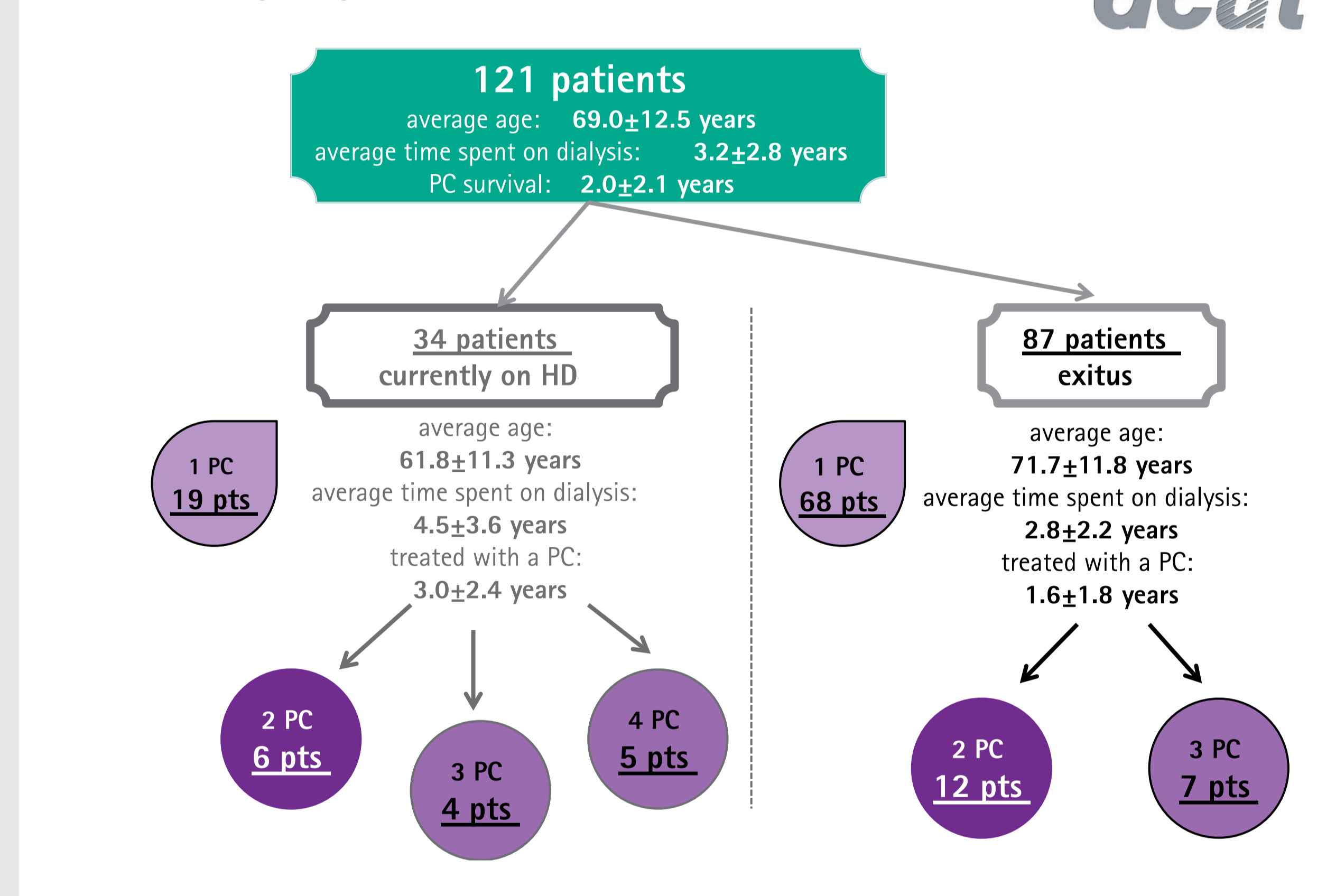
| | patients | average age at start of dialysis (years) | average time spent on dialysis (years) | of which treated with a PC (years) | |
|--------------|----------|--|--|------------------------------------|-----|
| all patients | 217 | 68.1±11.9 | 4.1±3.9 | 2.2±2.1 | 57% |
| women | 128 | 69.8±11.9 | 4.4±4.3 | 2.4±2.3 | 55% |
| men | 89 | 65.8±12.9 | 3.5±3.0 | 2.1±2.0 | 60% |

RESULTS

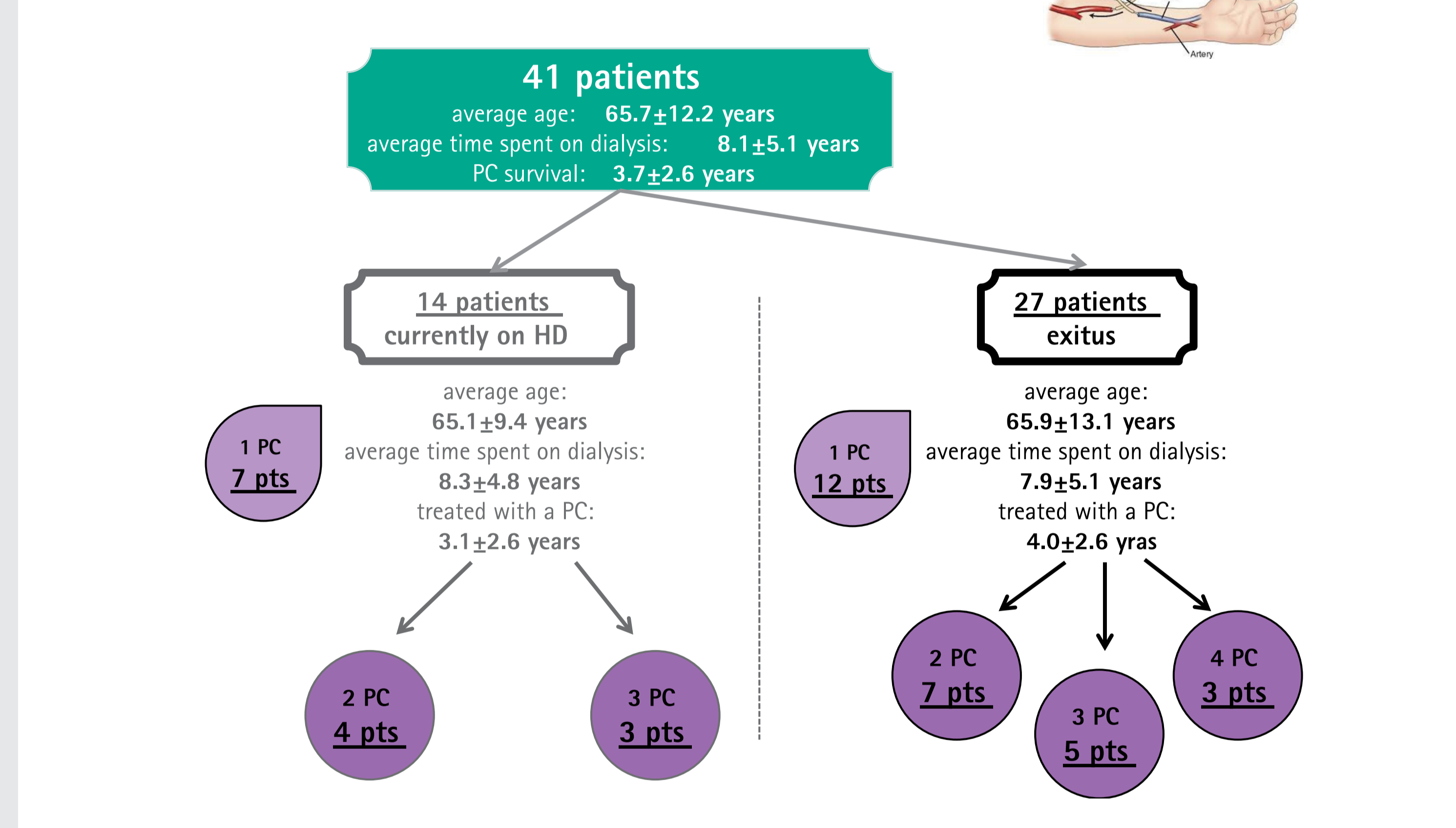
9. Distribution of permanent catheters according to the number of placements

| the number of implanted PC | 310 case | average age at start of dialysis (years) | average time spent on dialysis (years) | of which treated with a PC (years) | |
|----------------------------|----------|--|--|------------------------------------|-----|
| 1. | 197 | 70.3±12.2 | 2.9±3.3 | 1.4±1.5 | 48% |
| 2. | 68 | 65.2±10.7 | 5.3±3.3 | 3.3±2.3 | 62% |
| 3. | 36 | 62.3±13.5 | 7.3±3.8 | 4.9±2.4 | 67% |
| 4. | 9 | 58.7±9.1 | 9.2±4.9 | 6.3±1.8 | 68% |

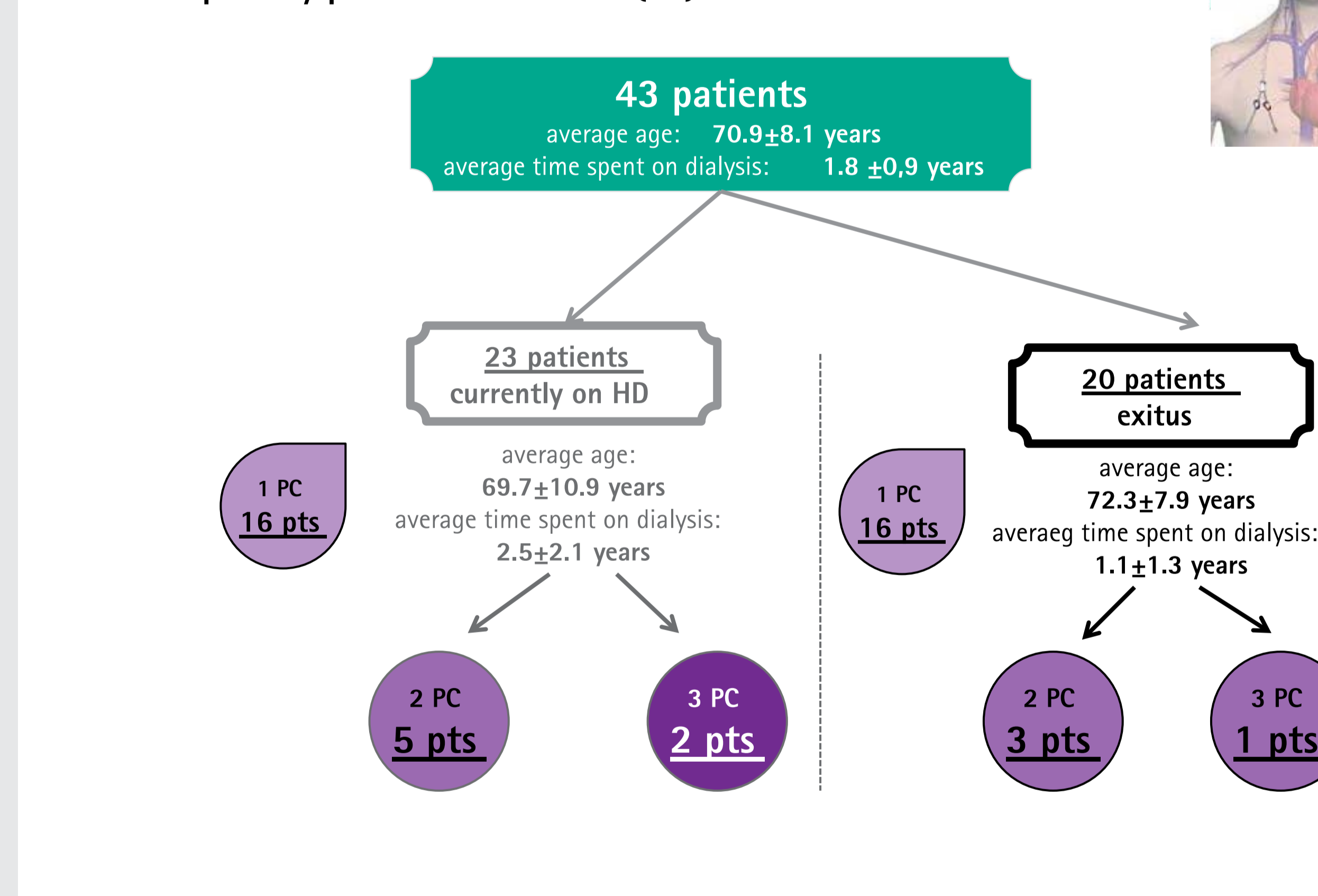
10. Evolution of the fate of patients starting with a temporary catheter (TC)



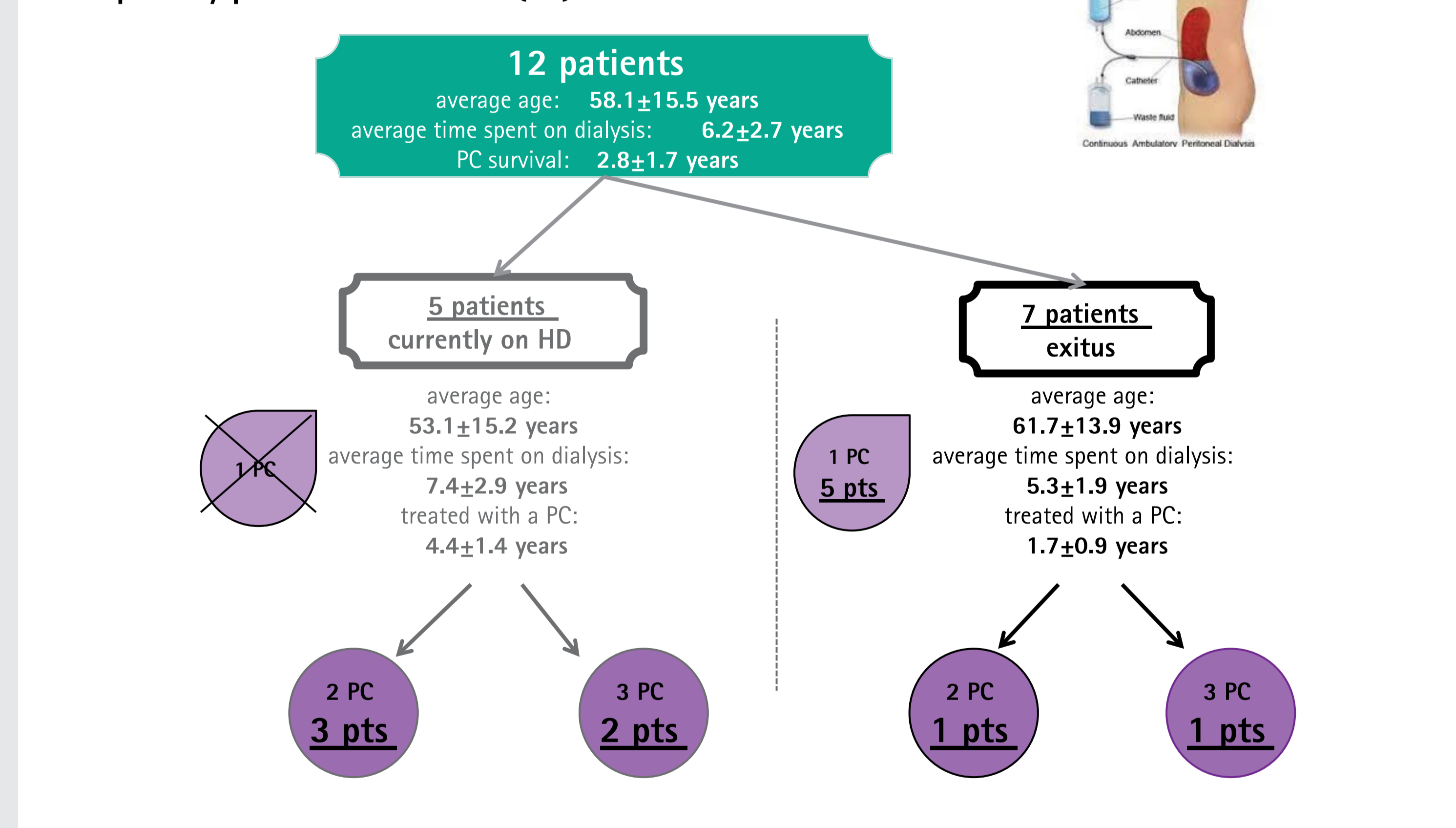
11. Evolution of the fate of patients starting with an arteriovenous fistula (AVF)



12. Evolution of the fate of patients starting with a primary permanent catheter (PC)



13. Evolution of the fate of patients treated through a primary permanent catheter (PC) from PD



15. 131 patients did not have infection (60.4%)

In 86 patients (39.6%), infection was observed on a total of 239 occasions (0.048 cases/1 patient month)

| patients | infection |
|----------|-----------|
| 35 | 1 |
| 18 | 2 |
| 13 | 3 |
| 5 | 4 |
| 5 | 5 |
| 3 | 6 |
| 5 | 7 |
| 1 | 8 |
| 1 | 9 |

15 patients
95 infection

16. Distribution of infections

| number of PC | exit site infection (cases) | tunnel infection (cases) | blood flow infection (cases) | number of cases (cases) |
|-------------------------|-----------------------------|--------------------------|------------------------------|-------------------------|
| 1. | 31 | 2 | 30 | 63 26.4% |
| 2. | 47 | 10 | 19 | 76 31.8% |
| 3. | 31 | 12 | 13 | 56 23.4% |
| 4. | 22 | 8 | 14 | 44 18.4% |
| total | 131 54.8% | 32 13.4% | 76 31.8% | 239 |
| cases / 1 patient month | 0.026 | 0.0065 | 0.0015 | 0.048 |

17. Incidence of PC infections between 2007 and 2015

| | exit site | | tunnel | | blood flow | | total infection | |
|--------------------------|-----------|---------------|--------|---------------|------------|---------------|-----------------|---------------|
| | cases | patient month | cases | patient month | cases | patient month | cases | patient month |
| total | 131 | 4923 | 32 | 4923 | 76 | 4923 | 239 | 4923 |
| cases / 1 patient month | - | 0.026 | - | 0.0065 | - | 0.015 | - | 0.048 |
| cases / 1000 patient day | - | 0.87 | - | 0.21 | - | 0.50 | - | 1.60 |

Because of an **early complication** (insufficient blood volume) we had to change the PC within one month in 13 cases.
Other **early complications** (infection, haemorrhage, arrhythmia, vein perforation, injury of surrounding organs) were not observed.

SUMMARY

- In our patients requiring haemodialysis treatment, the creation of an AVF, which is the preferred method of vascular access, is rendered increasingly difficult by the status of their vascular system.
- In Szombathely, more than half of the new patients arrive for a chronic HD programme without vascular access, in an acute condition; thus, for them the use of a tunneled central venous catheter represents a temporary or permanent solution.
- Currently the use of tunneled central venous catheters is an indispensable prerequisite of HD treatment.
- A basic prerequisite of their use is **catheter placement under aseptic surgical conditions** and, even more so, the **highly trained nurse staff**.
- All operations of the technological process are important: the **indication of insertion, the technique of catheter insertion, the careful care provided every other day, the close observation and the rapid, immediate intervention in case of a defect.**
- The careful treatment has made it possible to **prolong the survival of our patients by an average of 2.3 years through the use of a PC.**