

Inter-surgeon variability in long-term outcomes after transatrial repair of tetralogy of Fallot: 25 years experience with 675 patients.

Y d'Udekem, JC Galati, IE Konstantinov,
MMH Cheung, CP Brizard

Royal Children's Hospital, Melbourne; Australia

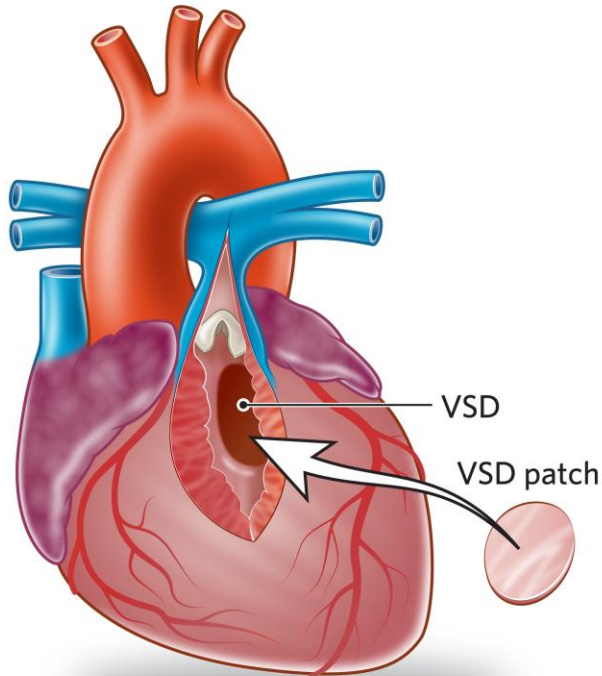


Disclosures:

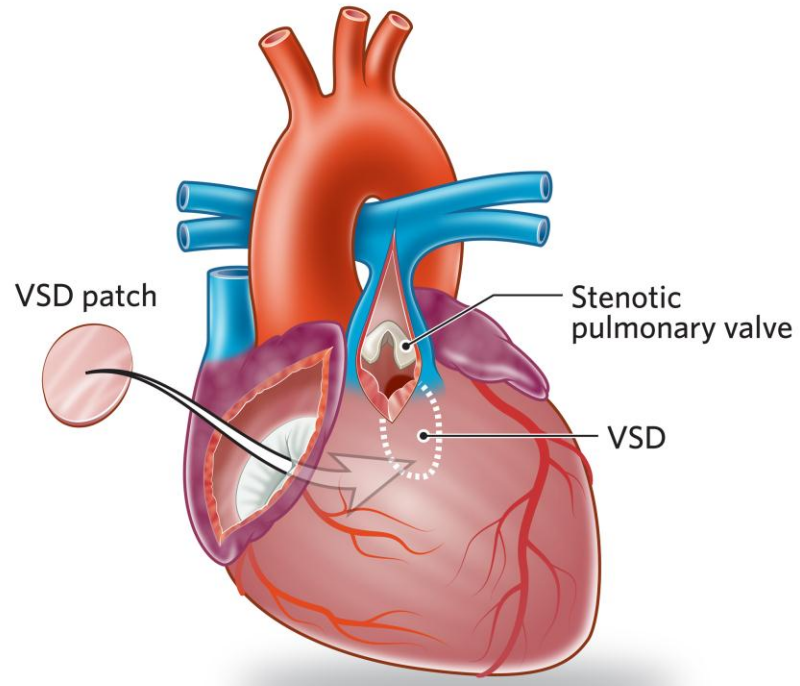
A/Pr Y d'Udekem: consultancy fees MSD

Background

Transventricular repair



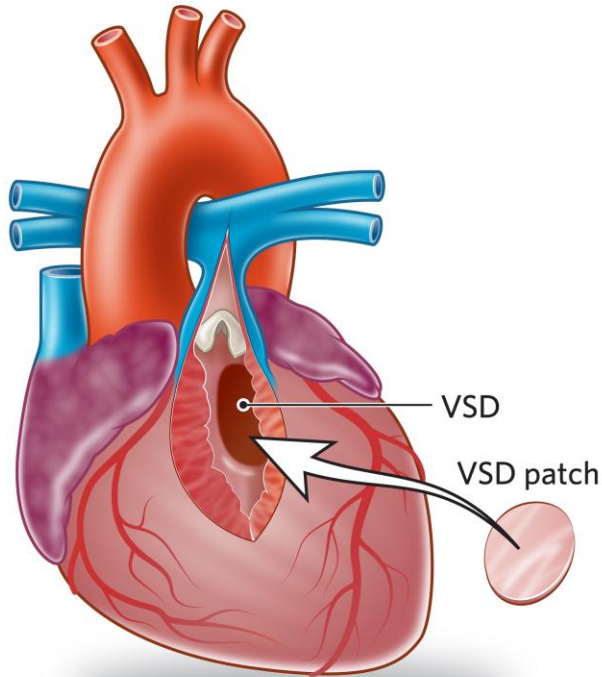
Transatrial repair



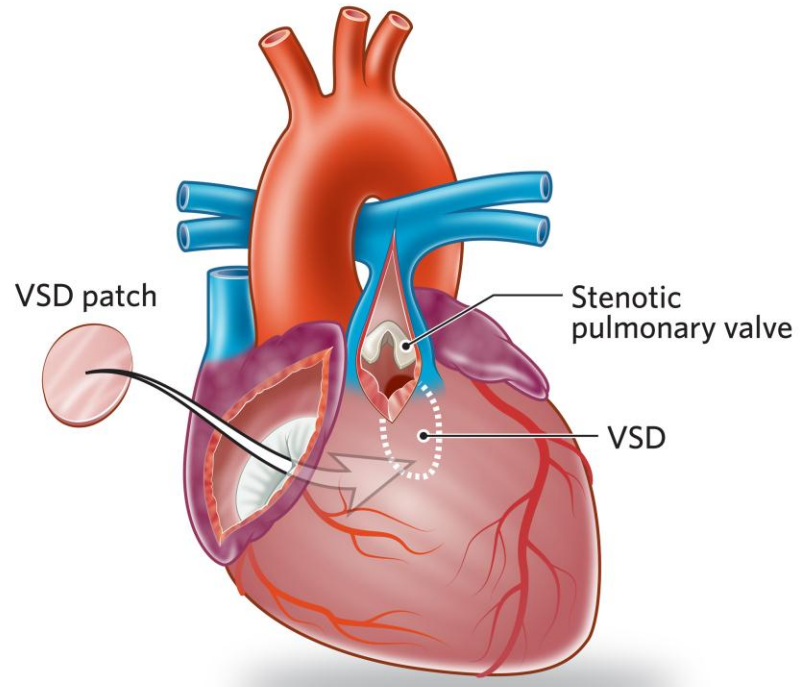
- **Up to 75 % of pts will require the opening of the pulmonary annulus, leading to chronic pulmonary regurgitation and RV dilatation, requiring RVOT valve implantation in 30-40 % of pts within 20 years.**

Background

Transventricular repair



Transatrial repair



- It has been hypothesized that transatrial repair, by minimizing the incision of the RVOT will protect against RV dilatation.

The Melbourne experience

- Since 1980: **consistent policy of repair** of TOF beyond the neonatal period (> 4 months).
- Since 1981 **Transatrial repair** adopted as the sole technique
- **675 pts** operated between 1980 and 2005 (excl. AVSD, PA, DORV)
- 220 pts (33%) early shunt palliation (hosp mortality 1%)
- Hospital mortality of transatrial repair : 1%
- **Mortality from birth to hosp discharge after repair: 2%**

The Melbourne experience

- 8 pts not accounted for in any databases (incl. National death registries)
- **2 late sudden unexpected deaths**
- **25-year freedom from RVOT valve implantation : 85%**
- **25-year freedom from reoperation for RVOTO: 89%**

Patients' recruitment of the RCH, Melbourne, Australia



Follow-up and reoperation in Australia

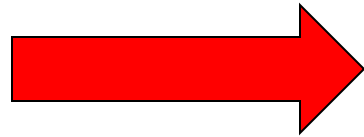
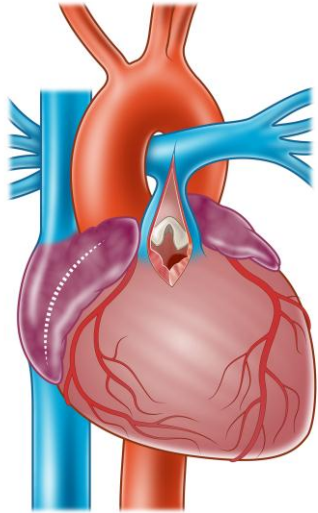


Aim of the study

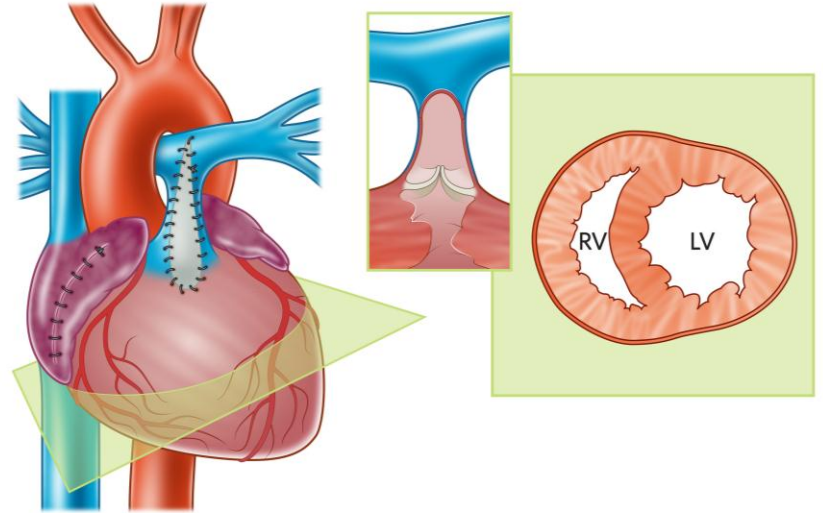
- **Inter-surgeons variability in outcomes ?????**
- Relatively homogenous population
- Standard policy of repair beyond neonatal age over 25 years
- Standardized technique of transatrial repair
- Endpoint : first reoperation on the outflow tract / PAs
- Total 25% at 25 years
 - Reop for RV dilat
 - Reop for RVOT
 - Reop for PA origin stenosis

Transatrial repair

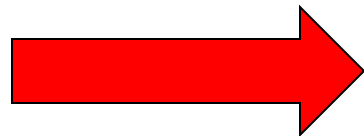
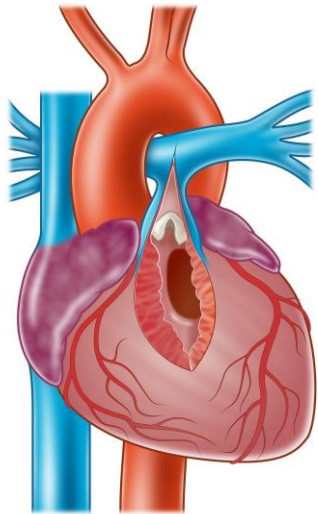
Small outflow tract incision



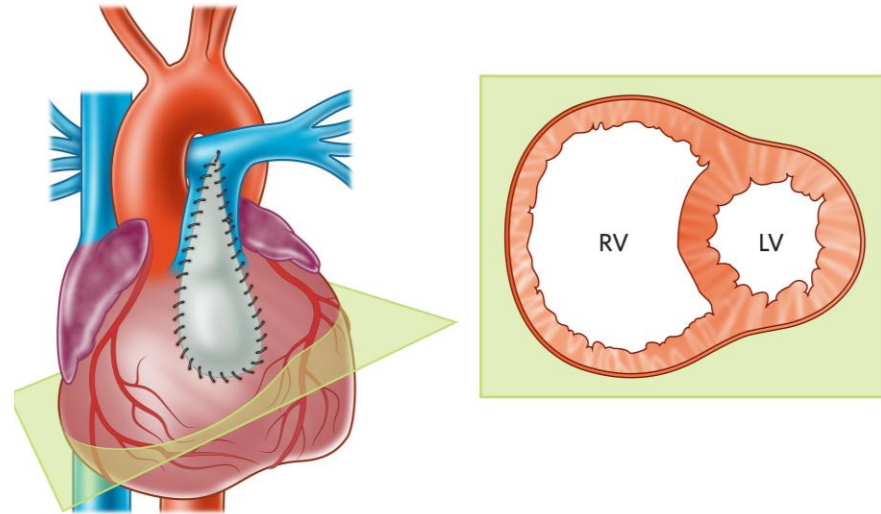
Right ventricular outflow tract obstruction



Large outflow tract incision



Right ventricular dilatation



Patients and Methods

675 pts (– 7 hosp deaths – 8 RV-PA conduits) = 660 pts operated by 13 surgeons

Each operated a total of 1, 1, 1, 5, 17, 17, 19, 39, 81, 84, 85, 127 and 164 pts

| | Surgeon | | | | | |
|----------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Characteristic | Reference Group | 1 | 2 | 3 | 4 | 5 |
| Number of Patients | 118 | 164 | 127 | 85 | 81 | 84 |
| Female (%) | 40% | 41% | 35% | 42% | 38% | 29% |
| Age at Repair (median/IQR) | 1.2 [0.8 – 1.7] | 1.4 [0.8 – 2.7] | 1.0 [0.7 – 1.3] | 1.1 [0.9 – 1.4] | 1.7 [1.1 – 3.2] | 0.9 [0.5 – 1.2] |
| Prior Palliation (%) | 33% | 32% | 24% | 34% | 41% | 27% |
| Monocusp (%) | 11% | 5% | 14% | 8% | 4% | 5% |
| Transannular Incision (%) | 63% | 49% | 72% | 68% | 58% | 81% |
| Patch Origin PAs (%) | 25% | 16% | 17% | 13% | 19% | 19% |

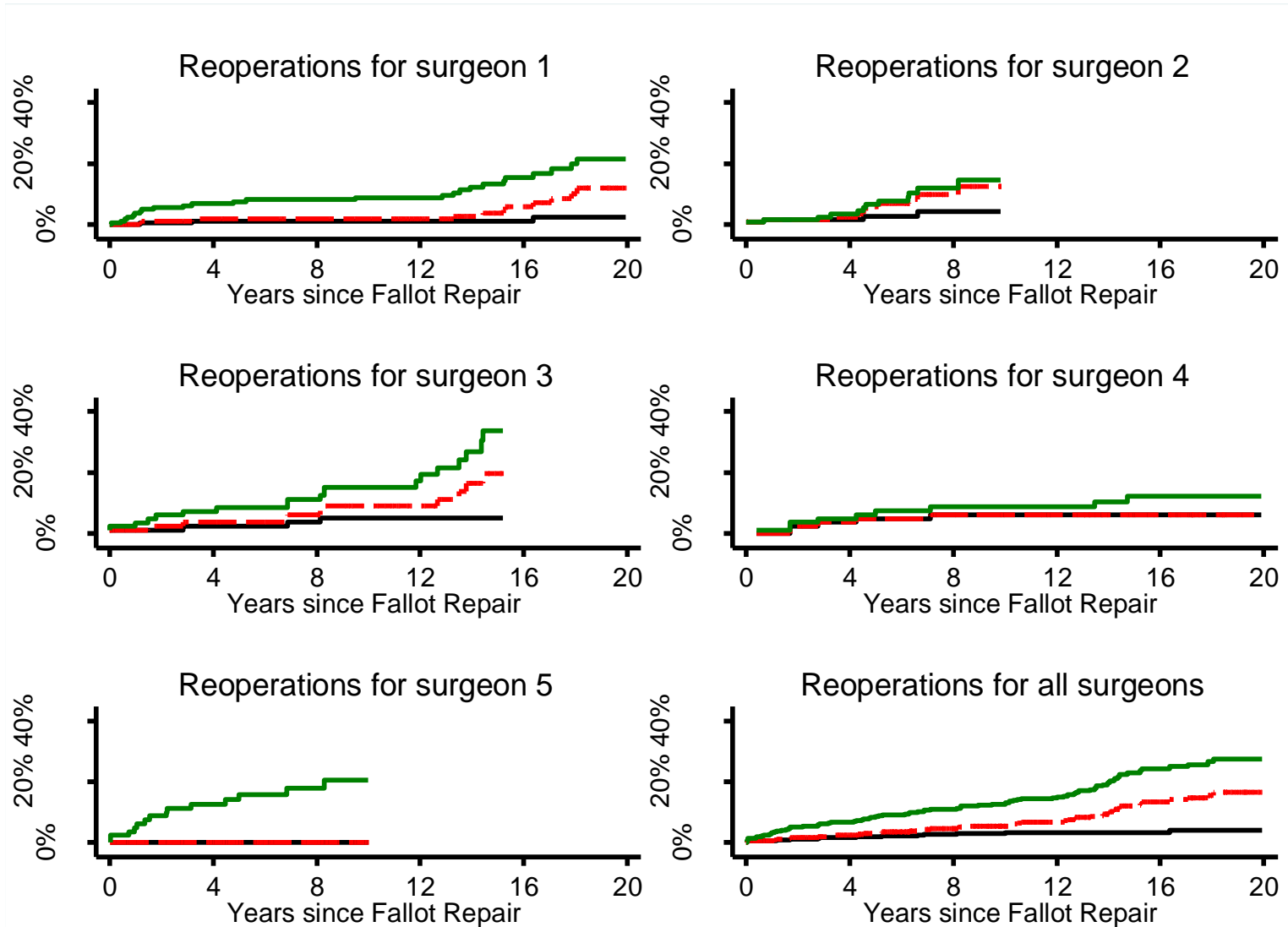
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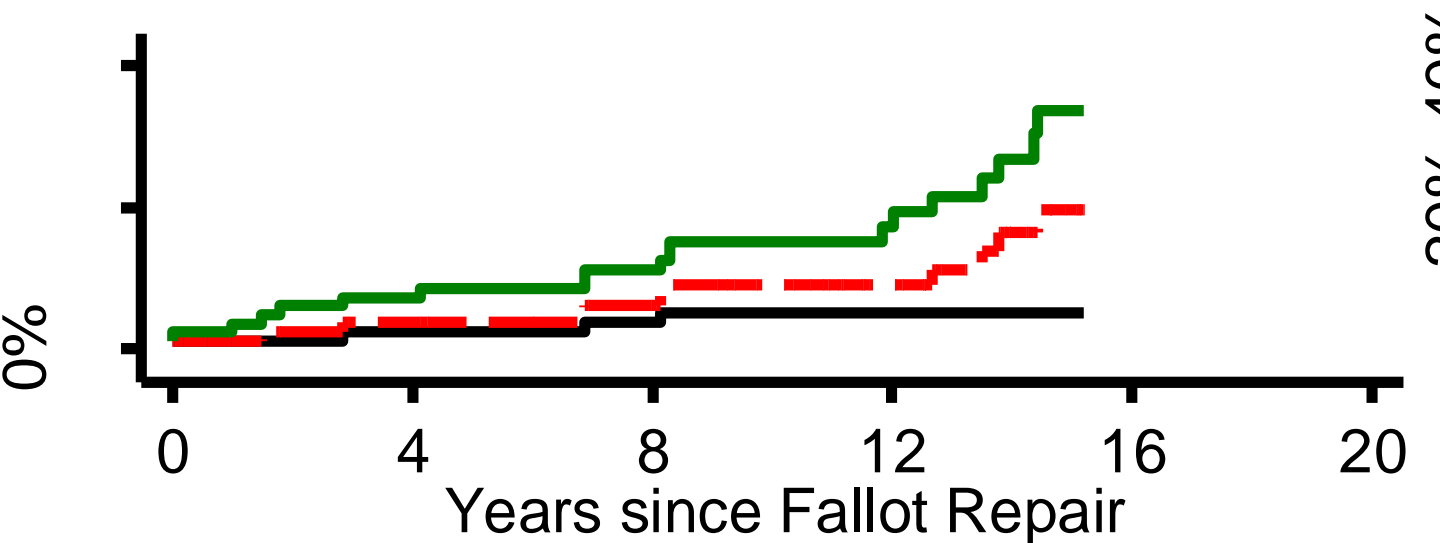
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Proportion of reoperations for **PA Stenosis (Black)**; **RV Dilatation (Black to Red)**; **RVOTO (Red to Green)**

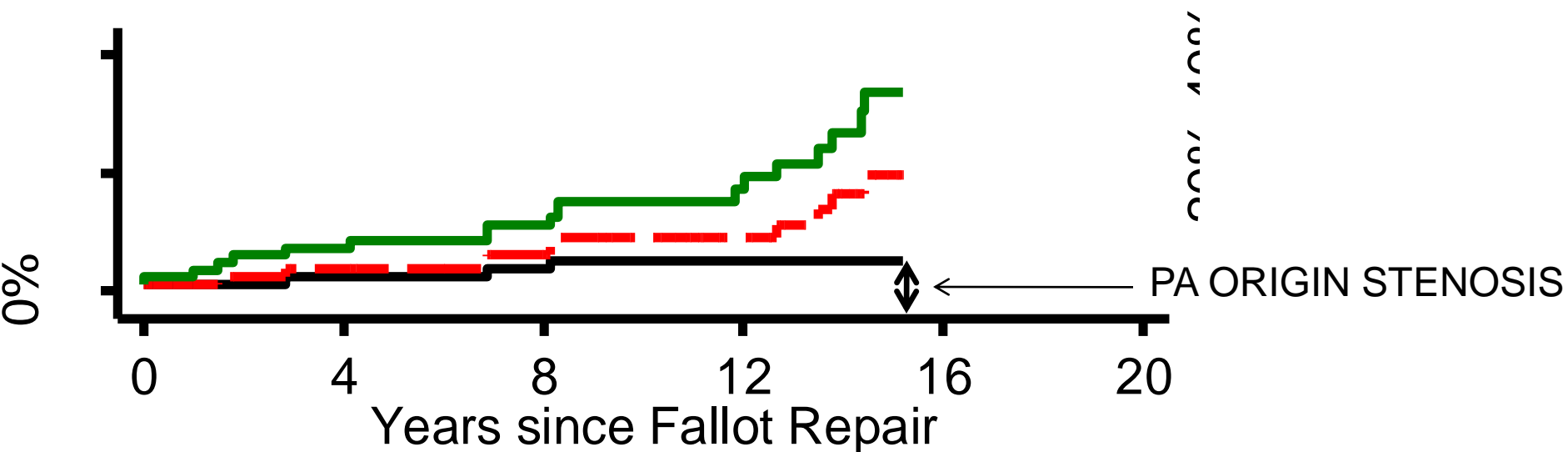


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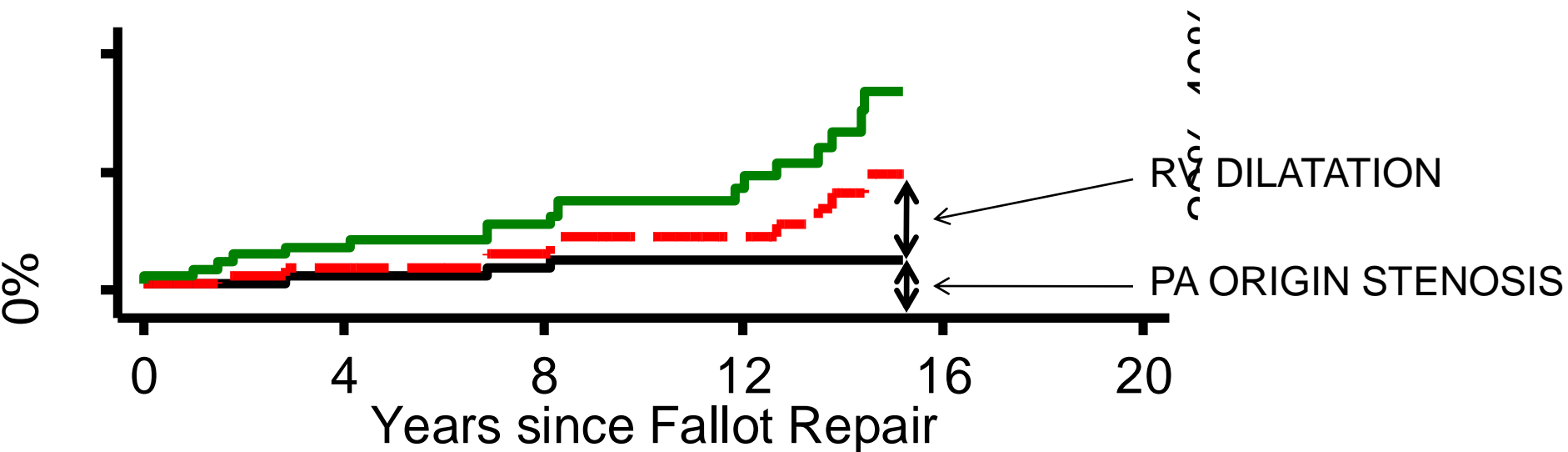
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REOPERATION FOR



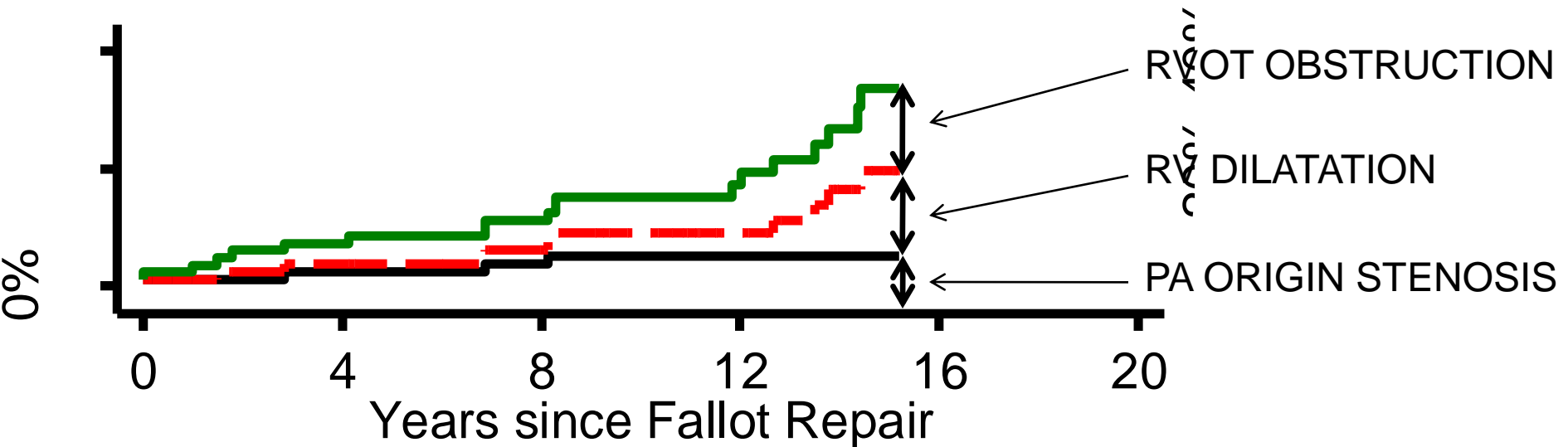
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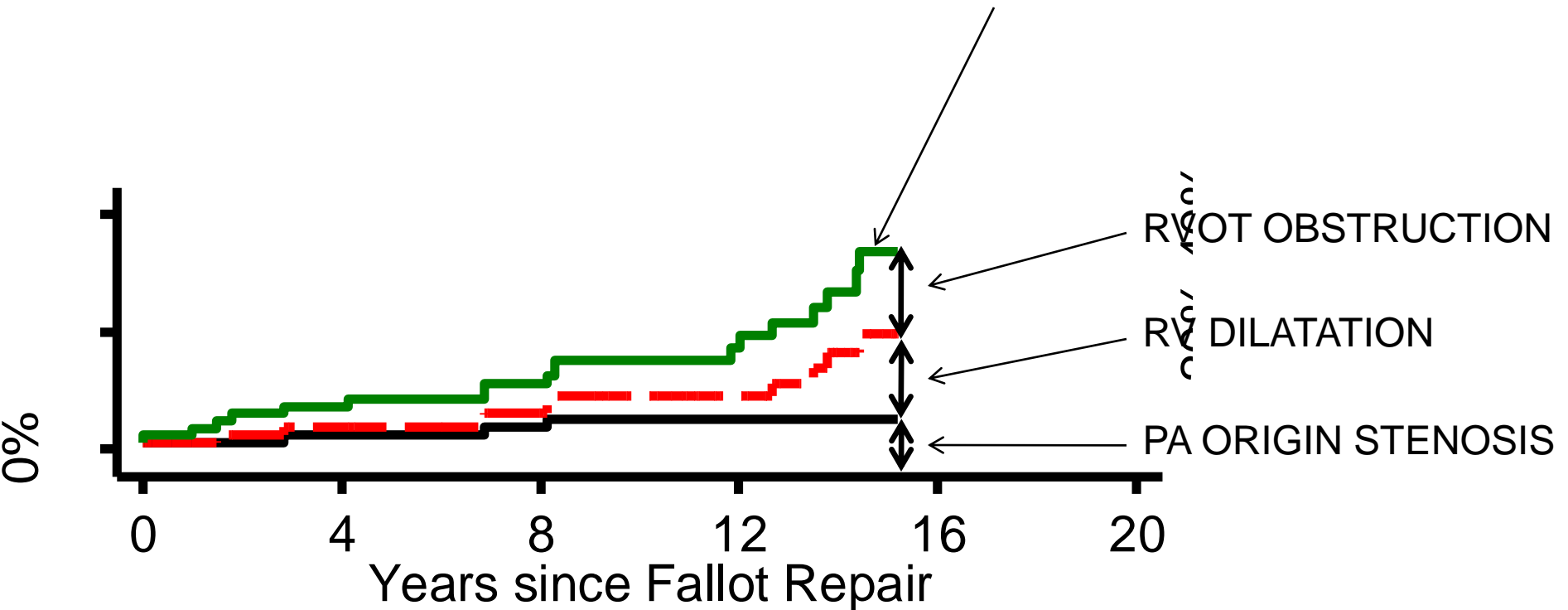
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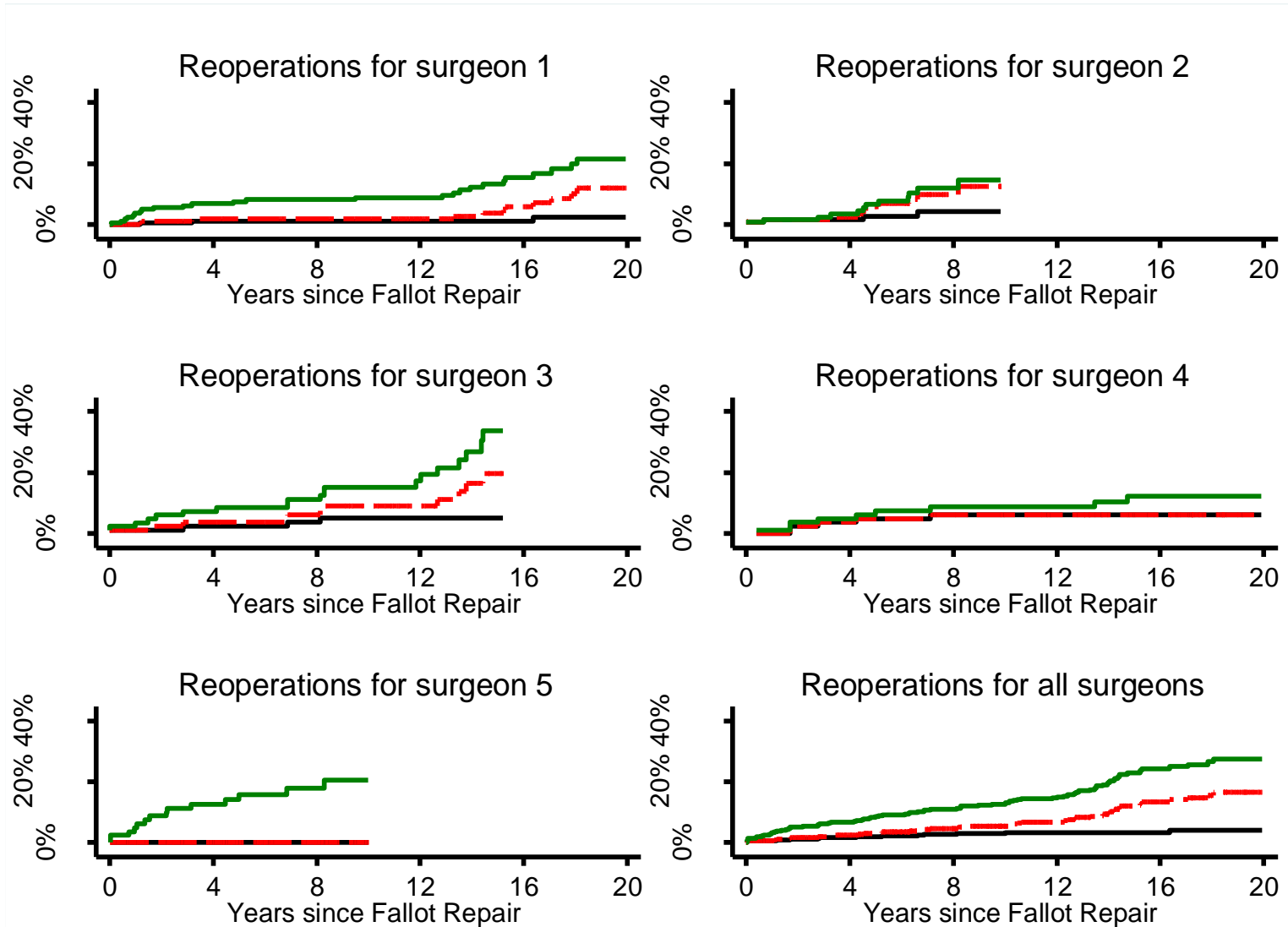


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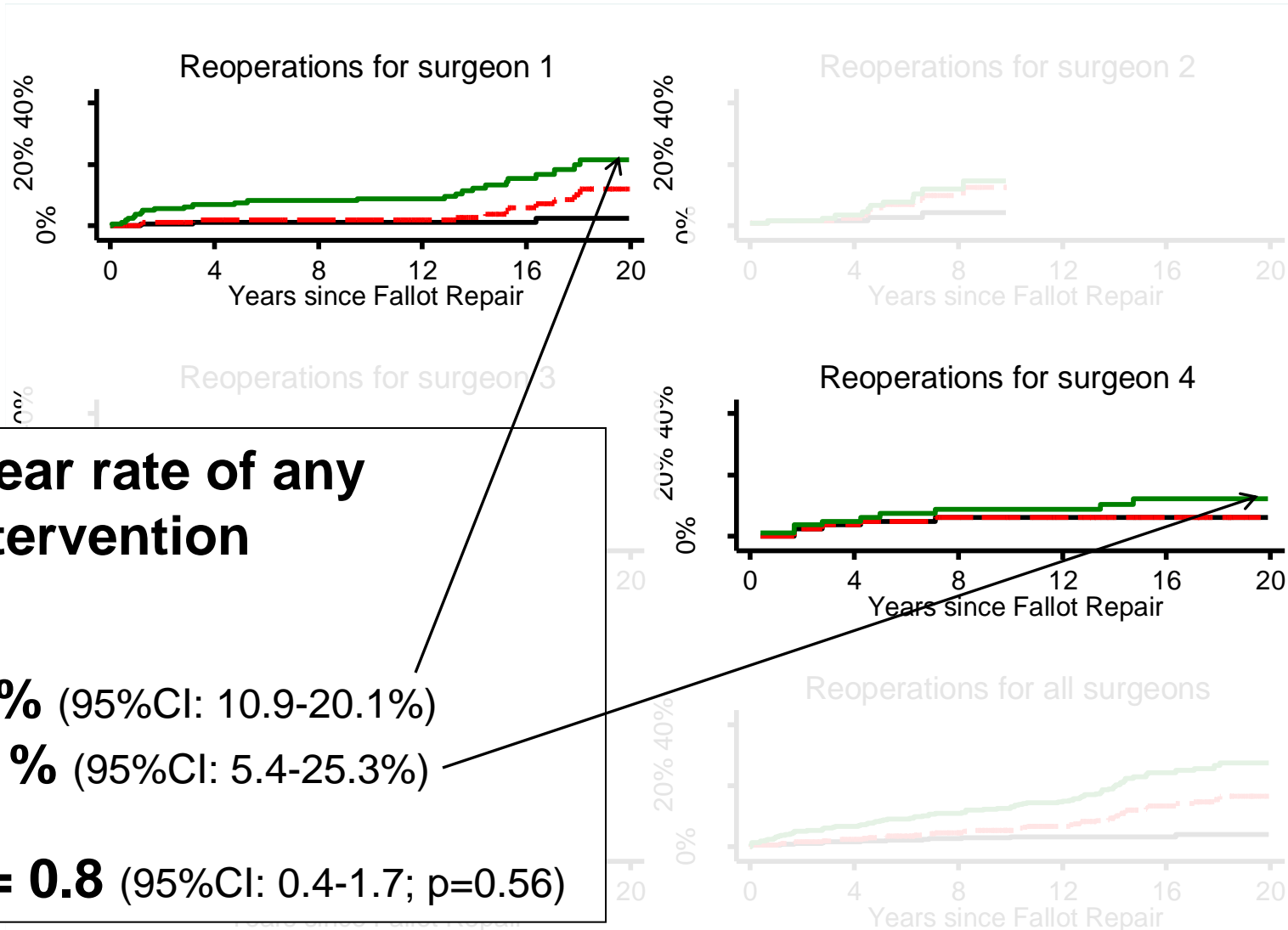
TOTAL NUMBER OF REOPERATIONS



Proportion of reoperations for **PA Stenosis (Black)**; **RV Dilatation (Black to Red)**; **RVOTO (Red to Green)**



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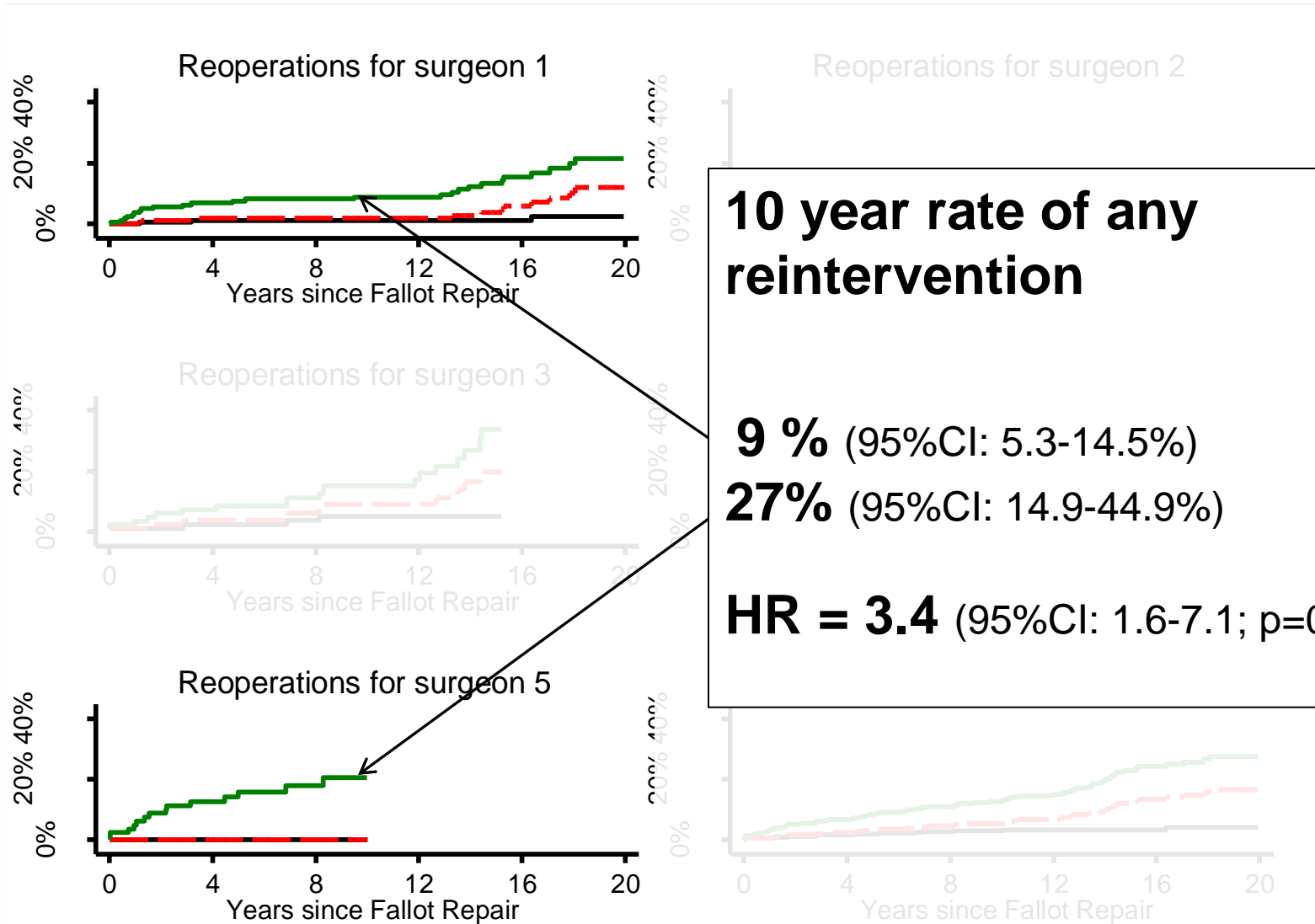
20 year rate of any reintervention

16.7% (95%CI: 10.9-20.1%)

10.5 % (95%CI: 5.4-25.3%)

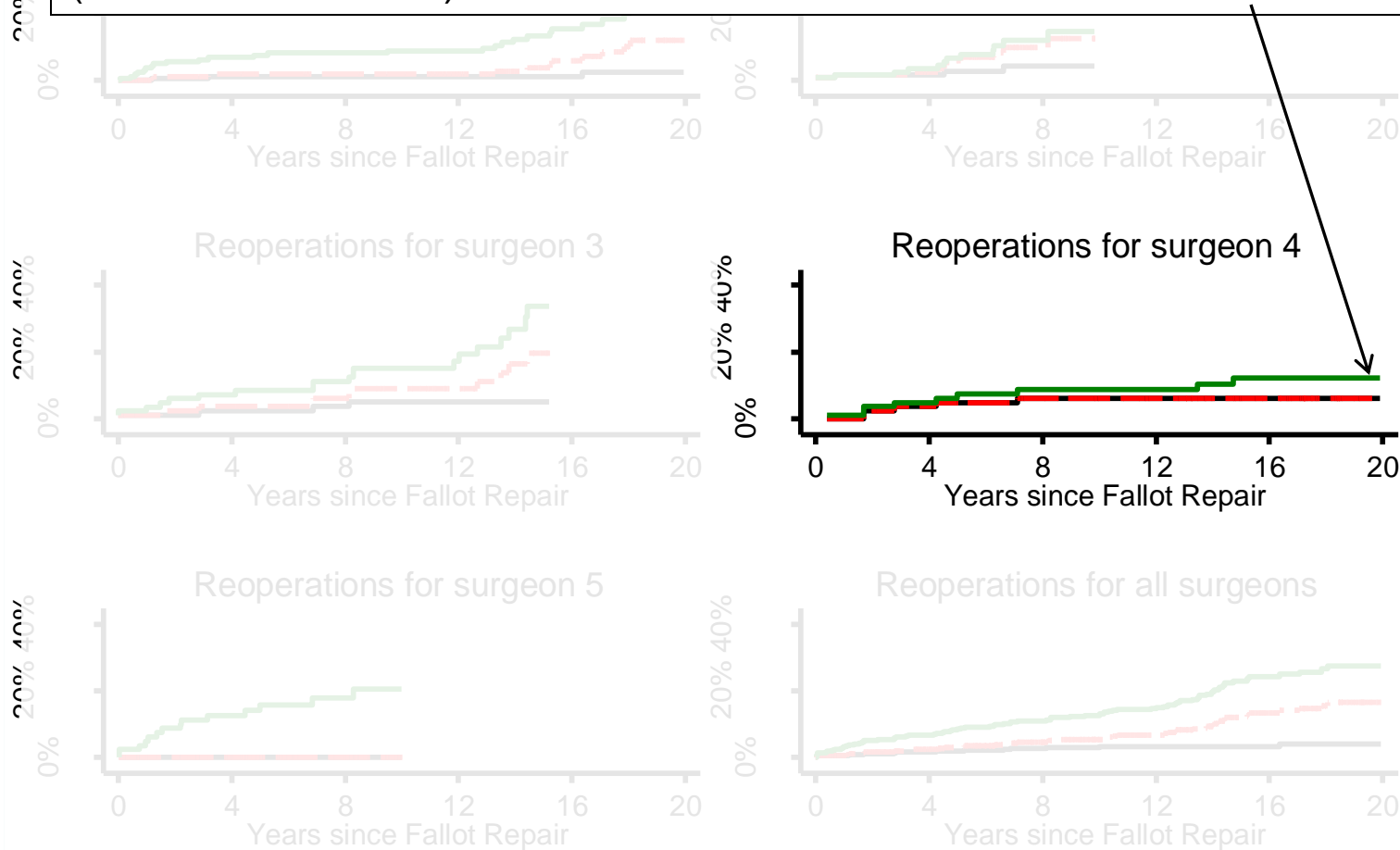
HR = 0.8 (95%CI: 0.4-1.7; p=0.56)

Difference in reoperations rate (PA Stenosis/RV DtI/RVOTO)



Proportion of reoperations for PA Stenosis (Black); RV Dilatation (Black to Red); RVOTO (Red to Green)

Lowest rate of reoperation at 20 years : 10.5 %
(95%CI: 5.4-25.3%)



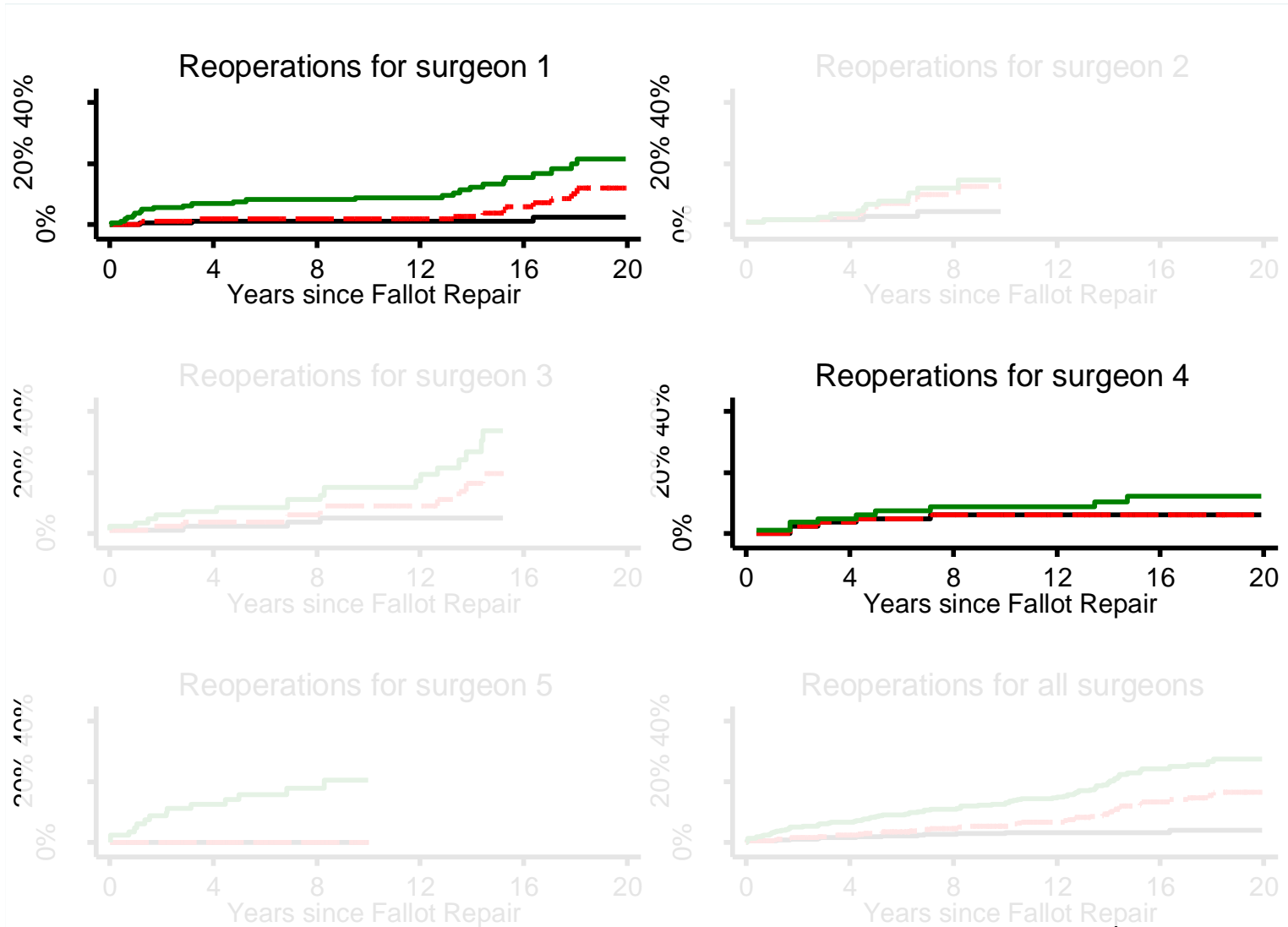
Risk adjusted analysis

- **Risk factors for first reop for the entire series (n=660)**
 - younger age at repair (HR=0.7; 95%CI: 0.5-0.9; p=0.003)
 - previous palliation (HR=2.1; 95% CI: 1.3-3.2; p=0.001)
- **Risk factors for first reop for the 5 surgeons (n=541)**
 - younger age at repair (HR=0.6; p=0.001)
 - previous palliation (HR=2.2; p=0.002)
- **Risk adjusted analysis confirmed the differences observed between surgeons**

HR=3.4 (95%CI: 1.6-7.1; p=0.001)

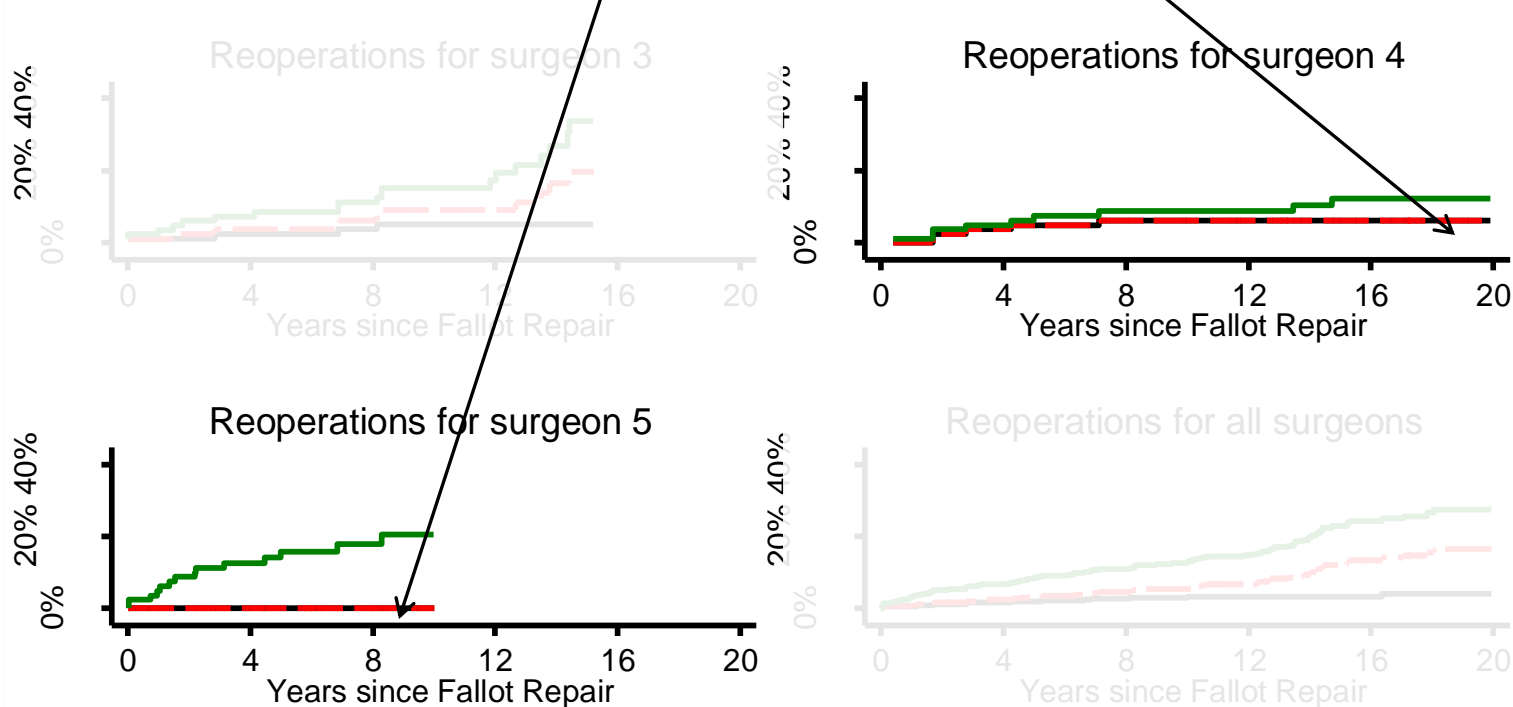
→ **HR=2.7** (95%CI: 1.3-5.6; p=0.011)

Proportion of reoperations for **PA Stenosis (Black)**; **RV Dilatation (Black to Red)**; **RVOTO (Red to Green)**



Proportion of reoperations for **PA Stenosis (Black)**;
RV Dilatation (Black to Red); **RVOTO (Red to Green)**

Rate of reoperation for PA stenosis
6.3% (95%CI: 2.7-14.4%) **at 10 and 20 years**
NO reoperation for PA stenosis!!

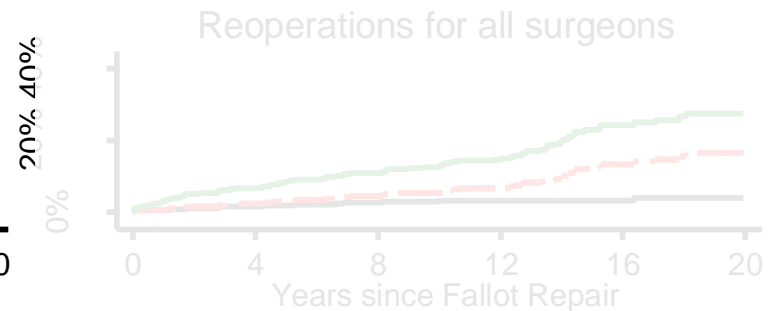
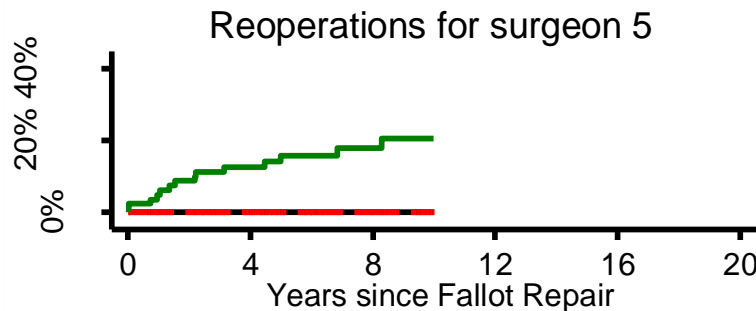
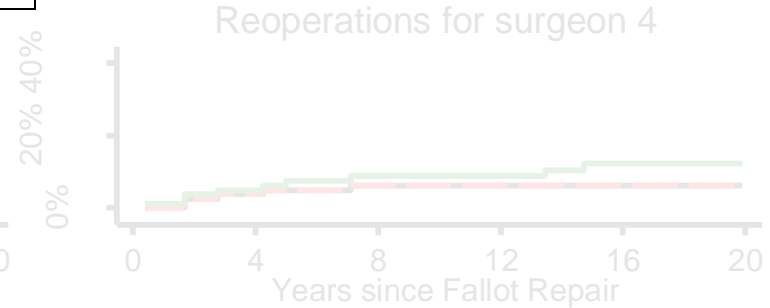
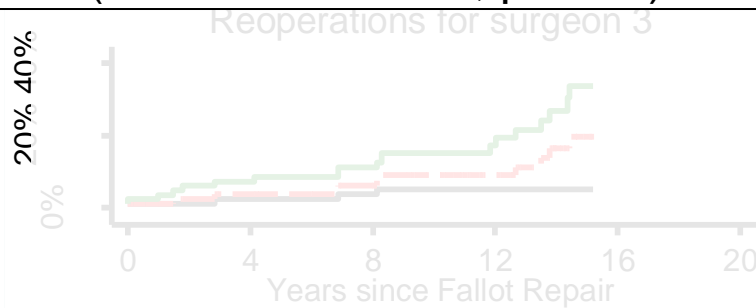
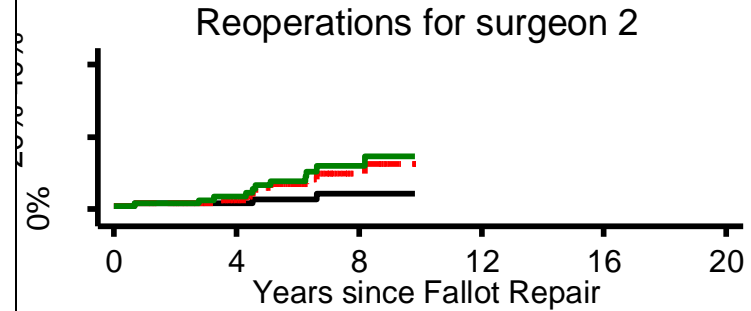


Proportion of reoperations for **PA Stenosis (Black)**; **RV Dilatation (Black to Red)**; **RVOTO (Red to Green)**

Similar rate of reoperation

24.1% (95%CI: 12.9-42.3%) versus
26.7% (95%CI: 14.9-44.9%)

HR=1.4 (95%CI: 0.7 to 2.9; p=0.32)

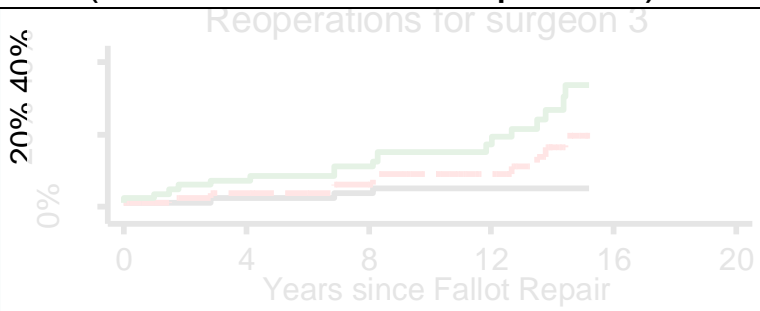
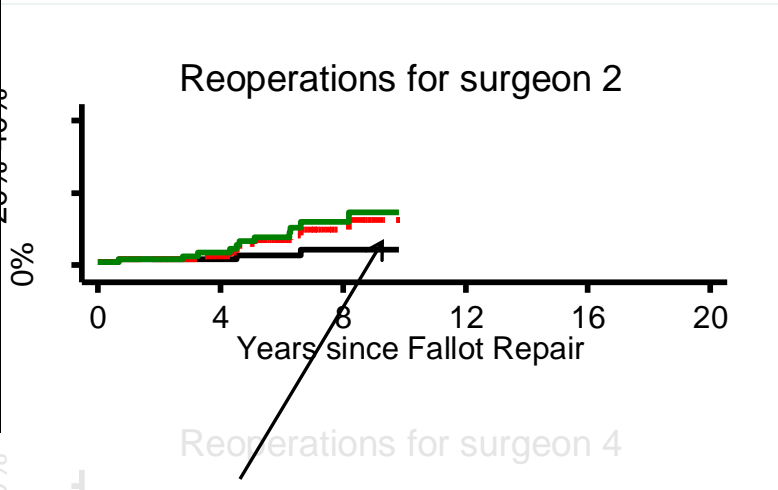


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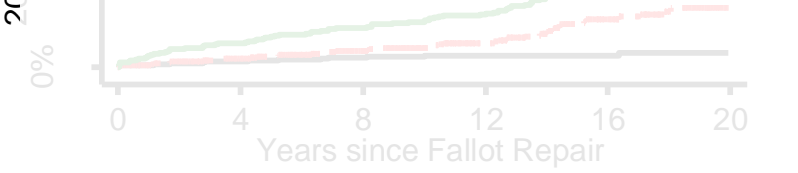
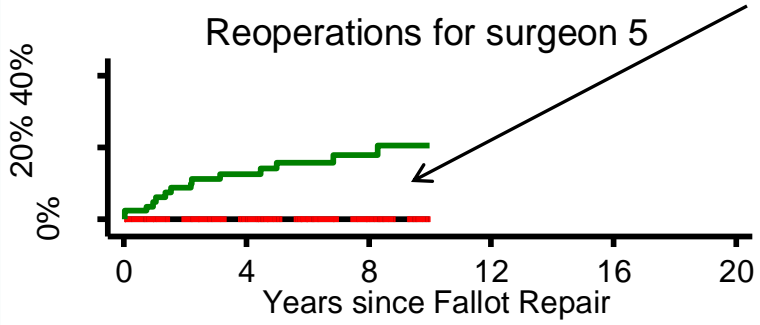
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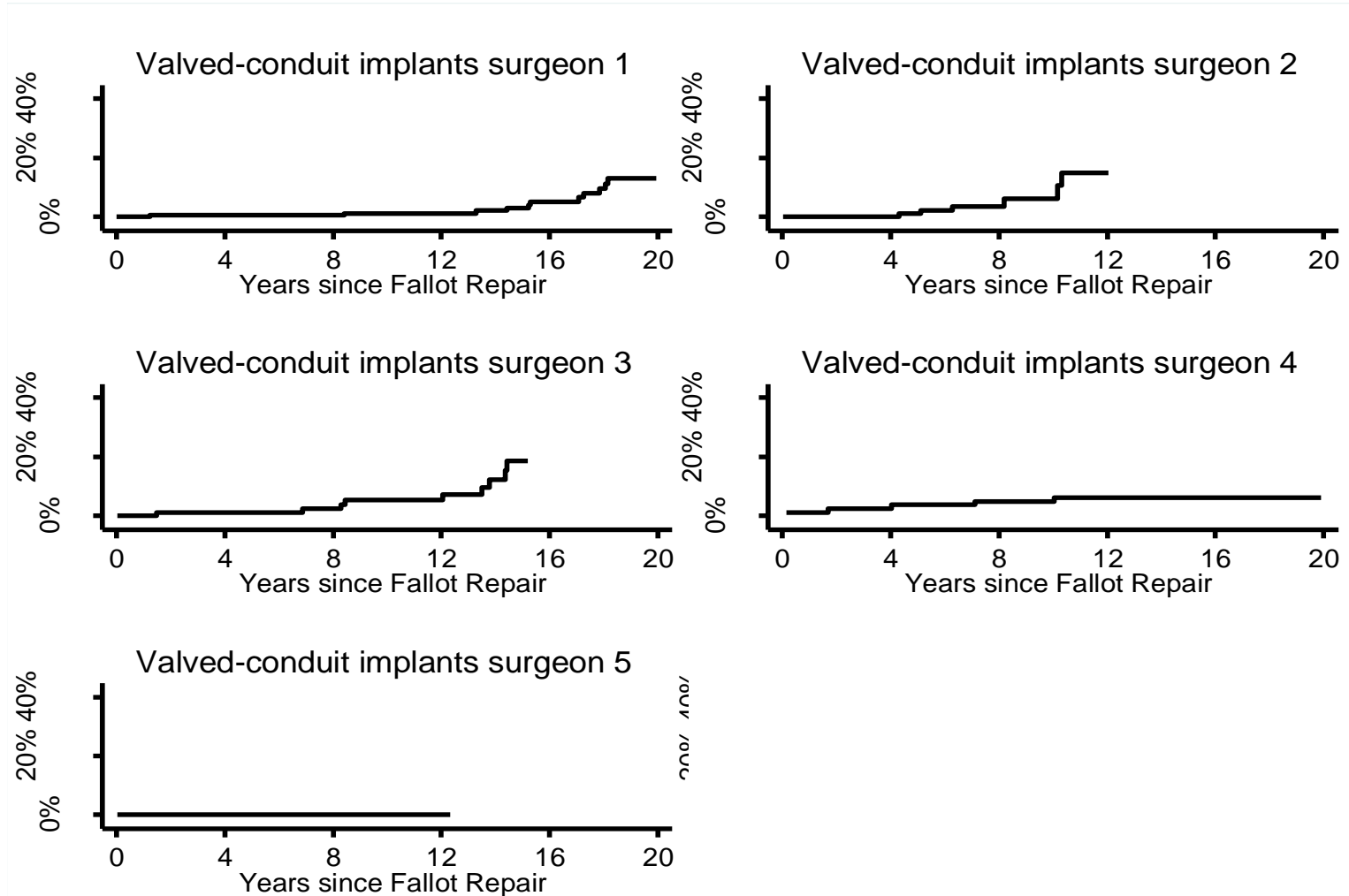
Indication for reoperation

RV DILAT 17.4% (95%CI: 7.8%-36.3%)
RVOTO 20.6% (95%CI: 12.4-33.1%)

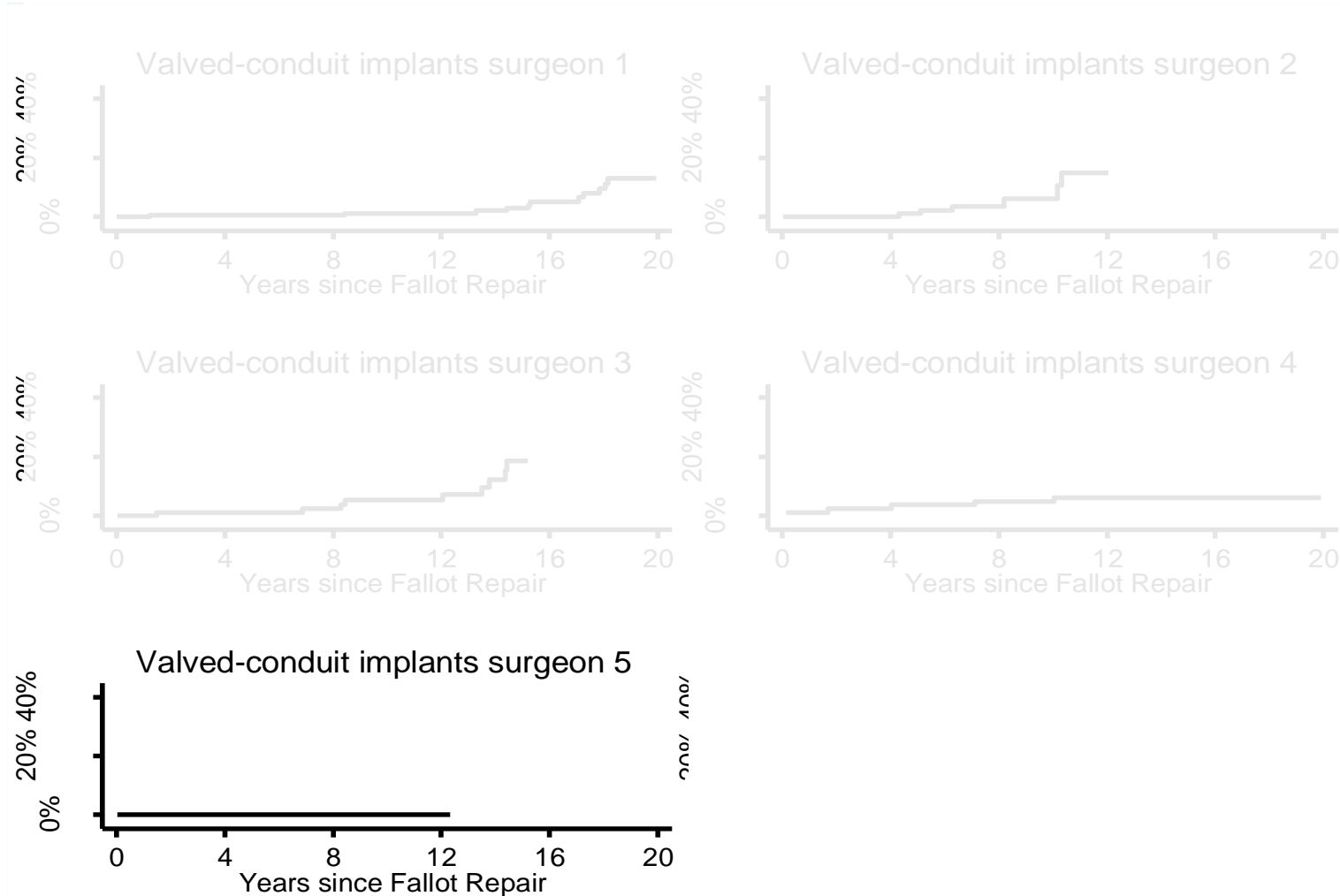
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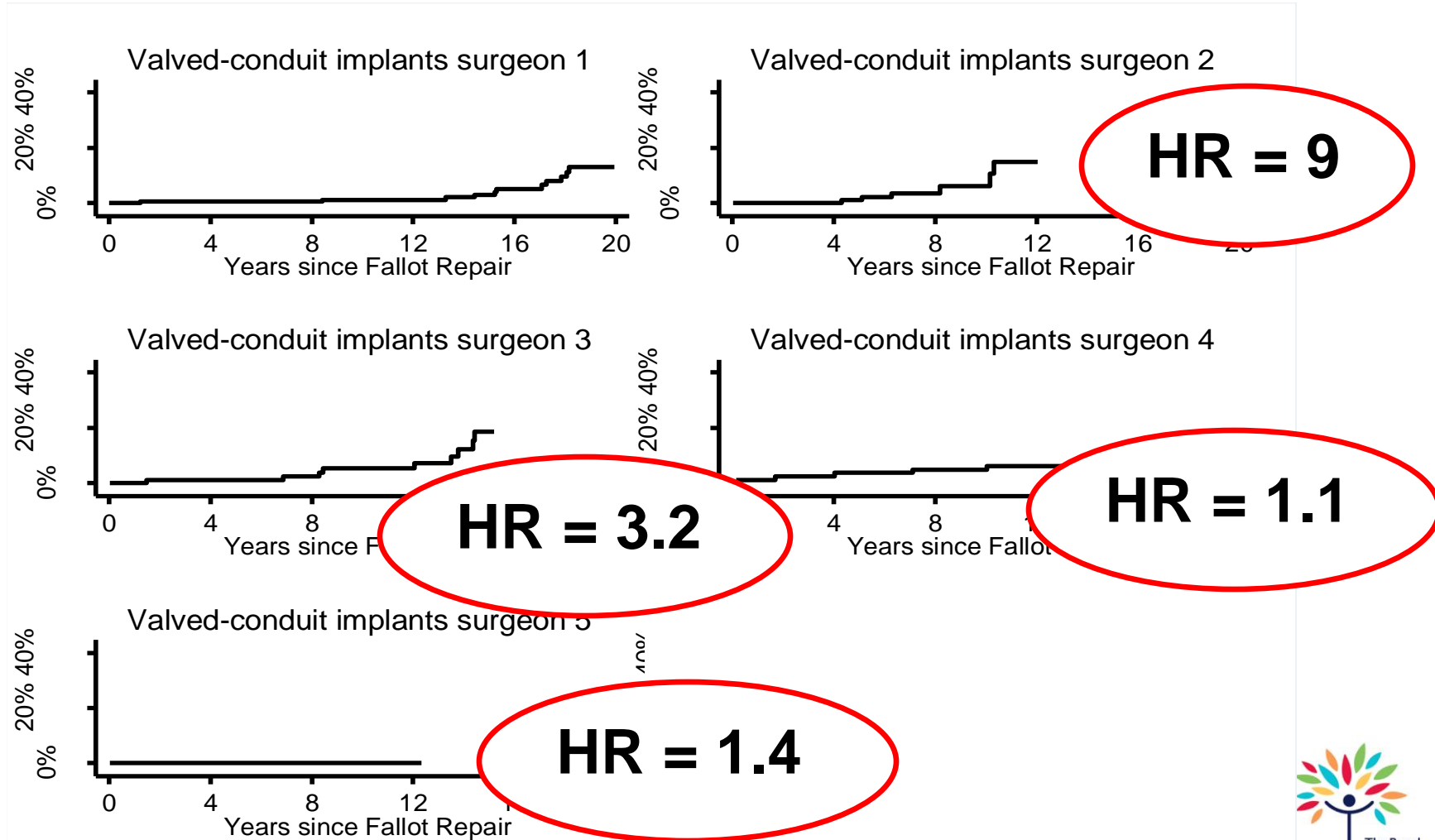
Rate of implantation of valved conduits (n=34; 541 pts)



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Limitations and strengths

- **Lack of MRI data**
- Surgeons examined in the study were **not all working in contemporary eras** limiting the validity of inter-surgeon comparison
- **Quality of follow-up**
 - Data checked on National Death Registries
 - Reoperations performed in a limited number of centres
 - Decision to reoperate team-based

Conclusions

- **After transatrial repair of tetralogy of Fallot, a difference in reoperation rate and in indication for reoperation can be observed between surgeons**
- **The analysis of these differences points to an optimal amount of opening of the RVOT leading to a minimal rate of reintervention**

Conclusions

- **A strategy of leaving a restrictive outflow tract seem to effectively protect against the deleterious effects of long-standing pulmonary regurgitation at the cost of a higher rate of reoperation for RVOTO.**
- **The analysis of inter-surgeon variability in outcomes should be encouraged because it may lead to an improvement in outcomes after cardiac surgery.**

Non-linear model for predicted relative hazard for any reoperation as a function of gradient

