A 75-year-old female presented with progressive dyspnoea NYHA functional class IV. Echocardiography revealed moderate regurgitation and severe stenosis ($P_{\text{mean}}$ 13 mmHg) of degenerated mitral valve (MV) with severe mitral annular calcification (MAC) (Panel A). Multislice computed tomography (MSCT) showed a ring-like pattern of the MAC with involvement of both MV leaflets (Panel B, MSCT of the MV annulus: inner diameter 28 × 23 mm, perimeter 82 mm). Owing to severe co-morbidities (STS score 13.8%) and a history of surgical aortic valve replacement in 2008, the Heart Team decided to perform transcatheter MV replacement (TMVR) via transapical access with implantation of a balloon-expandable Edwards-SAPIEN XT prosthesis (Edwards Lifesciences, Irvine, USA). For proper MV annular sizing, we used a 24-mm balloon valvuloplasty catheter (Osypka AG, Rheinfeld-Herten, Germany) for preparatory balloon mitral valvuloplasty with simultaneous left ventriculography (Panel C). Since no contrast regurgitation into the left atrium was obvious, we selected a 26-mm transcatheter heart valve (THV), which was implanted under transoesophageal echocardiographic (TEE) and fluoroscopic guidance (Panel D). Three dimensional-TEE and fluoroscopy confirmed proper TAVR valve positioning with only mild paravalvular MV regurgitation after valve expansion and acute reduction of the transvalvular mean pressure gradient to 3 mmHg (Panel E, two dimensional-TEE with MV regurgitation grade I–II; Panel F, 3D-TEE en-face-view of the acute procedural result with Doppler trace of the MV). After the procedure, the patient improved with a decrease in functional NYHA class to grade II. This case demonstrates that MV disease with calcified MV annulus may be treated by TMVR in selected high-risk patients.