Objective(s): Despite advances in surgical techniques, traditional open surgical repair for type B dissections is high-risk. Hybrid surgery with open surgical arch debranching and thoracic endovascular aortic repair has been recently proposed as a safe alternative. We present a patient who developed recurrent symptoms two months after acute type B dissection and underwent a successful hybrid aortic arch and descending aorta repair using a ministernotomy. Methods: A 55-year-old male presented with severe recurrent chest and back pain 2 months after type B aortic dissection. Computed tomography (CT) scan of the chest demonstrated increasing size of the false lumen, compression of the true lumen and a descending thoracic aortic aneurysm measuring greater than 4 cm. An upper mini-sternotomy extending to the right 4th intercostal space was performed. A 12 x 8 x 8 trifurcation graft (TG) was utilized for aortic arch reconstruction. The main limb of the TG was anastomosed to the ascending aorta. The brachiocephalic and left carotid vessels were transected 1 cm beyond their origins and serially anastomosed with 5-0 polypropylene to the individual limbs of the TG. A left infraclavicular incision was performed to isolate the left subclavian artery. The 3rd limb of the TG was anastomosed to the left subclavian artery. Next, bilateral femoral percutaneous access was obtained. A 38 x 34 x 250 mm Relay endograft (Bolton Medical, Sunrise, FL, USA) was deployed in Zone 0. The graft was positioned just distal to the takeoff of TG extending to the mid-descending aorta. A completion aortogram and IVUS were performed post-stent deployment. The patient was discharged on POD #6 without complications. Results: Post-procedure completion aortogram demonstrated no endoleak and IVUS noted the true lumen to be convex. One-month follow-up CT scan showed the endograft in correct position without endoleak and patent bypass grafts. A 6 month CT scan is planned. Conclusions: A hybrid aortic arch repair using a ministernotomy provided a successful outcome in a patient with a complex subacute type B dissection and descending thoracic aortic aneurysm. The repair allowed for a small incision and avoided cardiopulmonary bypass and circulatory arrest, while the use of a trifurcation graft allowed for simplification of arch vessel anastomoses.