**Table A1.** Clinical characteristics of Russian HCM patients with genetic findings (G+ patients are coloured in grey)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ID\*** | **Sex** | **Age at evaluation**  **(year)** | **Genotype** | | | **Age at**  **initial diagnosis**  **(year)** | **LVH pattern /**  **max LVWT (mm)** | | **LVOTO** | **Distinct features** | | **Outcomes** |
| **Gene** | **Variant\*\*** | **Variant classification**  **(→ reassessed)** |  |  |  | |  |  | |
| 1S | M | 58 | MYBPC3 | **NM\_000256.3:c.971del:p.I324Tfs\*26** | P/LP | 58 | AS / 19 | No | | Severe AH | No | |
| 2S | F | 36 | MYBPC3 | NM\_000256.3:c.927-9G>A | P/LP | 36 | AS / 23 | Yes | | Asymptomatic | AF, embolic stroke, ICD | |
| 5B | F | 61 | MYBPC3 | NM\_000256.3:c.1273C>T:p.Q425\* | P/LP | 43 | AS / 16 | Yes | | VT, conduction abnormalities | Hypokinetic HCM, AF, ICD | |
| 7S | F | 29 | MYBPC3 | NM\_000256.3:c.1351+2T>C | P/LP | 26 | AS / 16 | Yes | | Elite athlete | No | |
| 8S | F | 45 | MYBPC3 | NM\_000256.3:c.3697C>T:p.Q1233\* | P/LP | 36 | AS / 15 | Yes | | Mild symptomatic  3 deliveries | Myectomy at 51 | |
| 9E | M | 34 | MYBPC3 | NM\_000256.3:c.3697C>T:p.Q1233\* | P/LP | 34 | AS / 17 | No | | Asymptomatic | No | |
| 12A | F | 62 | MYBPC3 | NM\_000256.3:c.2441\_2443del:p.K814del | P/LP | 45 | AS / 24 | Yes | | SVA, severe AH | No | |
| 14H | F | 34 | MYBPC3 | NM\_000256.3:c.3697C>T:p.Q1233\* | P/LP | 23 | AS / 18 | Yes | | VT, multiple SCD in family | Myectomy at 26, ICD at 34, AF | |
| 17K | F | 65 | MYBPC3 | NM\_000256.3:c.1120C>T:p.Q374\* | P/LP | 64 | Ap / 20 | No | | CAD, SVA | AF, syncope | |
| 20K1 | M | 61 | MYBPC3 | NM\_000256.3:c.624G>C:p.Q208H | VUS→VUS | 60 | Ap-AS / 20 | Yes | | Syncope | Myectomy at 67 | |
| 26K | M | 46 | MYBPC3 | NM\_000256.3:c.2738-1G>A | P/LP | 34 | Ap / 26 | No | | Asymptomatic, VT | No | |
| 31S | M | 33 | MYBPC3 | NM\_000256.3:c.966G>A:p.W322\* | P/LP | 21 | AS / 23 | Yes | | NYHA II, angina | No | |
| 32T | M | 67 | MYBPC3 | NM\_000256.3:c.3811C>T:p.R1271\* | P/LP | 47 | AS / 21 | No | | VT, VEx, Cond abnormalities | Alive | |
| 33E | M | 38 | MYBPC3 | NM\_000256.3: c.3407\_3409del:p.Y1136del | P/LP | 38 | AS / 20 | Yes | | NC, asymptomatic | No | |
| 37G | M | 45 | MYBPC3 | NM\_000256.3:c.3697C>T:p.Q1233\* | P/LP | 44 | AS / 39 | Yes | | NYHA II, SVA | No | |
| 41D2 | F | 44 | MYBPC3 | **NM\_000256.3: c.2781\_2782insCACA: p.S928Hfs\*124** | P/LP | 37 | AS / 23 | Yes | | NYHA III | Myectomy at 46 | |
| 41Da2  Sib-twin | M | 44 | MYBPC3 | NM\_000256.3: c.2781\_2782insCACA: p.S928Hfs\*124 | P/LP | 44 | AS / 16 | No | | II NYHA | No | |
| 42P | M | 34 | MYPBC3 | NM\_000256.3:c.1037G>A:p.R346H | VUS→VUS-LP | 21 | Ap / 26 | No | | Asymptomatic | No | |
| 42Pa  Father | M | 60 | MYBPC3 | NM\_000256.3:c.1037G>A:p.R346H | VUS→VUS-LP | 27 | Ap / 21 | No | | NYHA II | No | |
| 51K | M | 35 | MYBPC3 | NM\_000256.3:c.3697C>T:p.Q1233\* | P/LP | 16 | AS / 26 | No | | VEx, VT | ICD at 37 | |
| 51Ka  Sib | M | 38 | MYBPC3 | NM\_000256.3:c.3697C>T:p.Q1233\* | P/LP | 17 | AS / 21 | No | | SVA | ICD at 39, AF | |
| 60L | F | 62 | MYBPC3 | NM\_000256.3:c.2429G>A:p.R810H | P/LP | 61 | AS / 24 | No | | NYHA III, Cond abnormalities | Hypokinetic HCM, AF | |
| 65K | M | 60 | MYBPC3 | NM\_000256.3:c.1731G>A:p.W577\* | P/LP | 47 | AS / 23 | Yes | | VT, 1st AV-block | Myectomy at 60 | |
| 70L | M | 51 | MYBPC3 | NM\_000256.3:c.3697C>T:p.Q1233\* | P/LP | 45 | AS / 25 | Yes | | Syncope, NYHA II | No | |
| 75M2 | F | 29 | MYBPC3 | NM\_000256.3:c.3697C>T:p.Q1233\* | P/LP | 17 | AS / 26 | No | | NYHA II | No | |
| 11L | F | 56 | MYH7 | NM\_000257.4:c.5135G>A:p.R1712Q | P/LP | 51 | AS / 25 | No | | NYHA II, Cond abnormalities | No | |
| 18L | M | 54 | MYH7 | NM\_000257.4:c.2185G>C:p.A729P | P/LP | 36 | AS / 18 | No | | Angina, VT | No | |
| 23B | M | 36 | MYH7 | NM\_000257.4:c.2276G>A:p.G759D | VUS→P/LP | 24 | Ap / 18 | No | | NC | No | |
| 24H | M | 36 | MYH7 | NM\_000257.4:c.2129C>T:p.P710L | P/LP | 24 | AS / 17 | Yes | | Asymptomatic, VT | No | |
| 34P | F | 45 | MYH7 | NM\_000257.4:c.2185G>C:p.A729P | P/LP | 40 | AS / 18 | No | | Asymptomatic | No | |
| 35N | M | 52 | MYH7 | NM\_000257.4: c.5134C>T:p.R1712W | P/LP | 47 | AS / 18 | Yes | | Syncope,  NYHA III | Myectomy at 56, AF | |
| 36S | F | 64 | MYH7 | NM\_000257.4:c.3569C>T:p.A1190V | P/LP | 62 | Ap / 24 | No | | Angina, SVA | No | |
| 43S | F | 62 | MYH7 | NM\_000257.4:c.1615A>G:p.M539V | P/LP | 42 | / 16 | No | | NYHA III, Sinus arrest, restrictive DD | Hypokinetic HCM, AF, Pacemaker | |
| 44S | F | 60 | MYH7 | NM\_000257.4:c.3652G>C:p.E1218Q | P/LP | 57 | AS / 19 | Yes | | NYHA III, Cond abnormalities | Myectomy at 62, AF, pacemaker | |
| 45F | F | 67 | MYH7 | NM\_000257.4:c.1711G>A:p.G571R | VUS→P/LP | 66 | SC / 22 | Yes | | NYHA III, severe AH | Myectomy at 67, AF | |
| 46S | M | 36 | MYH7 | NM\_000257.4:c.632C>T:p.P211L | P/LP | 33 | AS / 23 | Yes | | Asymptomatic | No | |
| 48R2 | M | 52 | MYH7 | NM\_000257.4:c.746G>A:p.R249Q | P/LP | 32 | AS / 22 | No | | NYHA II, SVA | AF | |
| 48Ra2  Daughter | F | 21 | MYH7 | NM\_000257.4:c.746G>A:p.R249Q | P/LP | 8 | AS / 28 | No | | NYHA II  Delivery | No | |
| 53M | F | 54 | MYH7 | **NM\_000257.4:c.4163A>G:p.E1388G** | VUS→VUS-LP | 54 | AS / 18 | No | | Severe AH, NYHA II | No | |
| 72A | M | 16 | MYH7 | NM\_000257.4:c.2221G>A:p.G741R | P/LP | 2 | AS / 23 | Yes | | NYHA III | Myectomy at 6 | |
| 72Aa  mother | F | 41 | MYH7 | NM\_000257.4:c.2221G>A:p.G741R | P/LP | 41 | PM / 13 | No | | Asymptomatic | No | |
| 73A2 | M | 38 | MYH7 | NM\_000257.4:c.2360G>A:**p.R787H** | VUS→VUS | 31 | Ap-AS / 43 | No | | NYHA II, angina, SVA, presyncope | No | |
| 76P | F | 25 | MYH7 | NM\_000257.4:c.1208G>A:p.R403Q | P/LP | 15 | AS / 30 | Yes | | NYHA II, syncope | No | |
| 77N | F | 44 | MYH7 | NM\_000257.4:c.2791G>A:p.E931K | P/LP | 13 | AS / 18 | No | | NYHA II, VT, SVA | No | |
| 29S | F | 41 | TPM1 | NM\_001018005.2:c.629A>G:p.Q210R | P/LP | 29 | AS / 17 | No | | Mild hydropericardium, VT asymptomatic | No | |
| 30K | F | 57 | TPM1 | NM\_001018005.2:c.629A>G:p.Q210R | P/LP | 44 | Meso / 22 | Yes | | 1st AV-block | No | |
| 30Ka  sib | F | 49 | TPM1 | NM\_001018005.2:c.629A>G:p.Q210R | P/LP | 49 | AS / 13 | No | | Asymptomatic | No | |
| 39S | M | 68 | TPM1 | NM\_001018005.2:c.629A>G:p.Q210R | P/LP | 68 | AS / 19 | No | | Asymptomatic | No | |
| 39Sa  daughter | F | 38 | TPM1 | NM\_001018005.2:c.629A>G:p.Q210R | P/LP | 37 | AS / 13 | No | | NYHA II, mild hydropericardium | No | |
| 63A | M | 48 | TPM1 | **NM\_001018005.2:c.86A>G:p.K29R** | VUS→VUS-LP | 42 | AS / 25 | No | | Asymptomatic | No | |
| 66C | F | 32 | TPM1 | NM\_001018005.2:c.574G>A:p. p.E192K | P/LP | 32 | AS / 20 | No | | Asymptomatic, SVT | No | |
| 21U | F | 56 | TNNT2 | NM\_001276345.2:c.341C>T:p.A114V | P/LP | 48 | AS / 20 | Yes | | NYHA II, Cond abnormalities, angina | No | |
| 25C | M | 67 | TNNT2 | NM\_001276345.2:c.862C>T:p.R288C | P/LP | 67 | AS / 27 | Yes | | Mild Ao stenosis | Stroke at 66 | |
| 6E | F | 50 | TNNI3 | NM\_000363.5:c.557G>A:p.R186Q | P/LP | 36 | Meso / 18 | No | | RV obstruction | AF, SVA,  NYHA III | |
| 56H3 | M | 25 | TNNI3 | NM\_000363.5:c.422G>A:p.R140Q | P/LP | 25 | Ap / 17 | No | | Asymptomatic | No | |
| 10G | F | 28 | MYL2 | NM\_000432.4:c.275-8C>A | VUS→LP | 5 | Bi, Meso / 23 | Yes | | Restrictive DD, NYHA II, Cond abnormalities | AF, ICD at 36 | |
| 22S | F | 44 | MYL2 | NM\_000432.4:c.353+7G>A | VUS→VUS | 28 | AS / 25 | No | | SVA, VT | ICD at 44 | |
| 38V | M | 38 | ALPK3 | NM\_020778.5:c.4689delG:p.W1563\* | P/LP | 34 | SC / 32 | Yes | | Severe AH, VT | Myectomy at 38 | |
| 38Va  Father | M | 62 | ALPK3 | NM\_020778.5:c.4689delG:p.W1563\* | P/LP | 62 | AS / 28 | Yes | | Severe AH, Asymptomatic | No | |
| 38Vb  Sib | F | 36 | ALPK3 | NM\_020778.5:c.4689delG:p.W1563\* | P/LP | 36 | AS / 13 | No | | Asymptomatic | No | |
| 4Ga  son | M | 42 | FLNC | NM\_001458.5:c.5500C>T:p.H1834Y | VUS→VUS-LP | 42 | AS / 13 | No | | Asymptomatic | No | |
| 28M2 | F | 71 | FLNC | NM\_001458.5:c.5945G>A:p.R1982H | VUS→VUS-LP | 71 | Ap / 20 | No | | NYHA III, VEx | No | |
| 55M | M | 67 | FLNC | NM\_001458.5:c.2635C>T:p.R879C | VUS→VUS-LB | 67 | AS / 20 | Yes | | CAD, NYHA II | AF | |
| 16N | M | 77 | FHOD3 | NM\_001281740.3:c.4375C>T:p.R1459W | VUS→VUS-LB | 40 | AS / 9 | No | | VT, LVEF 35% | Hypokinetic HCM, death from HF | |
| 61L | M | 41 | FHOD3 | **NM\_001281740.3:c.2429G>A:p.G810E** | VUS→VUS | 41 | Ap / 16 | No | | Asymptomatic, Cond abnormalities | No | |
| 69R | F | 51 | TCAP | NM 003673.4:c.448G>A:p.G150S | VUS→VUS | 51 | AS / 16 | No | | Myalgia, CK elevation, angina, NYHA III | No | |
| 74A2 | M | 42 | BAG3 | **NM\_004281.4:c.656C>T:p.P219L** | VUS→VUS | 41 | Ap-A / 24 | No | | Angina | No | |
| 49D | M | 66 | GAA | NM\_000152.5:c.2237G>C:p.W746S | VUS→VUS | 64 | Meso / 23 | No | | NYHA II, VEx, SVA, midvent obstruction | No | |
| 59D | M | 69 | LAMP2 | **NM\_002294.3:c.244delG:p.D82Ifs\*7**  (Mosaicism 17%) | P/LP | 69 | AS / 17 | Yes | | VT, SVA | No | |
| 15M | M | 18 | TRIM63  TRIM63 | NM\_032588.4:c.739C>T:p.Q247\*  NM\_032588.4:c.224G>A:p.C75Y | P/LP | 15 | AS / 24 | No | | Asymptomatic athlete | No | |
| 3B | F | 29 | MYBPC3  TNNC1 | NM\_000256.3:c.3697C>T:p.Q1233\*  NM\_003280.3:c.86T>A:p.L29Q | P/LP  P/LP | 22 | AS / 25 | Yes | | 3 deliveries, 4 children | Myectomy at 28, SCD at 42 | |
| 4G | F | 51 | MYBPC3  FLNC | **NM\_000256.3:c.3790T>C:p.C1264R**  NM\_001458.5:c.5500C>T:p.H1834Y | P/LP  VUS→VUS-LP | 51 | SC / 20 | Yes | | Severe AH, SCD of eldest son | Hypokinetic HCM, AF, fatal stroke at 57 | |
| 19B | F | 33 | MYBPC3  FLNC | NM\_000256.3:c.743\_746del: p.D248Afs\*51  NM\_001458.5:c.4413A>T: p.Q1471H | P/LP  VUS→VUS-LB | 19 | Ap-AS / 22 | No | | NYHA II | No | |
| 27K | M | 46 | MYBPC3  FLNC | NM\_000256.3:c.2905+1G>A  NM\_001458.5:c.1609T>G:p.Y537D | P/LP  VUS→LP | 34 | AS / 26 | No | | NYHA III | AF | |
| 47S | M | 60 | MYH7  FLNC | NM\_000257.4:c.4180G>A:p.A1394T  NM\_001458.5:c.6214G>A:p.G2072R | VUS→VUS-LP  VUS→VUS-LP | 60 | AS / 18 | No | | Expanded fibrosis (41% LGE) | AF | |
| 50S | F | 61 | TPM1  MYBPC3 | **NM\_001018005.2:c.74C>T:p.A25V**  NM\_000256.3:c.932C>T: p.S311L | P/LP  VUS→VUS | 61 | Ap-AS / 14 | No | | Asymptomatic | No | |
| 50Sa  Sib | M | 55 | TPM1  MYBPC3 | NM\_001018005.2:c.74C>T:p.A25V  NM\_000256.3:c.932C>T: p.S311L | P/LP  VUS→VUS | 55 | Ap-AS / 15 | No | | NYHA II | No | |
| 52D2 | M | 24 | MYH7  FHOD3 | NM\_000257.4:c.2156G>A:p.R719Q  NM\_001281740.3:c.1754C>A:p.S585Y | P/LP  VUS→VUS-LB | 23 | AS / 15 | No | | NC, LVEF < 65% | AF, PV ablation | |
| 54V | M | 51 | MYBPC3  MYBPC3 | NM\_000256.3:c.3794A>T:p.E1265V  NM\_000256.3:c.3796T>C:p.C1266R | P/LP  P/LP | 40 | AS / 23 | No | | SVA | AF | |
| 62B | M | 39 | MYBPC3  ALPK3 | NM\_000256.3:c.1037G>A:p.R346H NM\_020778.5:c.3967G>A:p.A1323T | VUS→VUS-LP  VUS→VUS | 39 | Ap-AS / 17 | No | | Asymptomatic  ST elevation | No | |
| 62Ba  Sib | M | 33 | MYBPC3  ALPK3 | NM\_000256.3:c.1037G>A:p.R346H NM\_020778.5:c.3967G>A:p.A1323T | VUS→VUS-LP  VUS→VUS | 30 | AS / 18 | No | | Cond abnormalities  ST elevation | No | |
| 64B | F | 46 | ACTC1  FLNC | NM\_005159.5:c.940C>T:p.R314C  **NM\_001458.5:c.15C>A p.5S>R** | P/LP  VUS-LB | 46 | AS / 16 | Yes | | SVA, Cond abnormalities | Alcohol ablation | |
| 67V | M | 51 | MYBPC3  GLA | NM\_000256.3:c.2623C>T:p.H875Y  NM\_000169.3:c.1060A>G:p.I354V | VUS→VUS-LP  VUS→LB | 51 | AS / 21 | Yes | | SVA | AF, Myectomy at 51 | |
| 68A | M | 35 | TNNC1  MYH7 | NM\_003280.3:c.435C>A:p.D145E **NM\_000257.4:c.3627C>G:p.N1209K** | P/LP  VUS→VUS-LP | 35 | AS / 16 | Yes | | Angina, NYHA II | No | |
| 71Z | M | 47 | FLNC  FLNC | NM\_001458.5:c.2377G>A:p.E793K NM\_001458.5:c.5020G>A:p.G1674S | VUS→VUS-LB  VUS→VUS-LB | 47 | AS / 15 | No | | Angina | No | |
| 78K | F | 42 | MYBPC3  MYH7 | NM\_000256.3:c.3697C>T:p.Q1233\*  NM\_000257.4:c.5137G>A:p.V1713M | P/LP  VUS→VUS | 42 | PM / 17 | No | | Palpitations  Severe HCM in child (same genotype) | No | |
| 13S | M | 40 | MYBPC3  MYBPC3  FLNC | NM\_000256.3:c.3763G>A:p.A1255T  NM\_000256.3:c.538G>A:p.G180S  NM\_001458.5:c5500C>T:p.H1834Y | P/LP  VUS→VUS  VUS→VUS-LP | 39 | AS / 25 | Yes | | NC, VT, VEx, SVEx | Death from HF at 44 | |
| 40R | M | 29 | MYH7  MYH7  PTPN11 | **NM\_000257.4:c.137T>A:p.F46Y** NM\_000257.4:c.5346G>A: p.M1782I NM\_001330437.1: c.925A>G:p.I309V | VUS→VUS-LP  VUS→LP  VUS→LB | 14 | AS / 19 | Yes | | NC, Cond abnormalities | Myectomy at 31 | |
| 58M2 | M | 38 | ALPK3  ALPK3  MYBPC3 | NM\_020778.5:c.1958C>G:p.S653\* NM\_020778.5:c.3491G>A:p.R1164Q  NM\_000256.3:c.667G>A:p.E223K | P/LP  VUS→VUS-LP  VUS→VUS | 38 | SC / 16 | No | | Restrictive DD, LVEF 34% | Hypokinetic HCM | |

A – anterior; AH – arterial hypertension; Ao – aorta; Ap – apical; AS – asymmetric septal; Bi – biventricular hypertrophy; CK – creatine kinase; Cond – conduction (abnormalities); DD – diastolic dysfunction; ID – identification number of patients in the present study; LGE – late gadolinium enhancement; Meso – mesoventricular; NC – non-compaction myocardium; NYHA - New York Heart Association; PM – papillary muscle; SC – symmetric concentric; Sib – sibling; SVEx – supraventricular extrasystole; SVA – supraventricular arrhythmia; VEx – ventricular extrasystole (> 500/24h); VT – ventricular tachycardia;

\*in order of inclusion in the study

\*\*Novel variants are spelled in bold; All variants are in heterozygosity

1Jewdish origin; 2Turkic origin; 3Armenian origin