**Supplementary Table S1:** **Patient characteristics.** Neonatal concentrations of screening TSH, serum TSH, T3, T4, fT4, thyroglobulin, and thyroid morphology examined by ultrasound are depicted. uk (unknow); HD (patients from Heidelberg); Mz (patient from Mainz).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Patient | gender | Sreening TSH (IU/L) | Serum TSH (IU/L) | Serum T3 (nmol/L) | Serum T4  (nmol/L) | Serum fT4  (pmol/L) | Thyroglobulin (ng/ml) | Ultrasound |
| HD-1 | female | 38 | >100 | 1.1 | 28.84 | 4.04 | >250 | Normal thyroidea |
| HD-2 | male | 644 | uk | uk | uk | uk | uk | Normal thyroidea |
| HD-3 | male | 767.1 | uk | uk | uk | uk | uk | Normal thyroidea |
| HD-4 | male | 84 | 114.6 | 2.1 | 111.1 | 14.2 | 1.7 | athyreosis |
| HD-5 | female | 68.1 | 150 | 1.04 | 3.4 | 5.58 | 3.9 | hypoplasia |
| HD-6 | female | 162.3 | >150 | 0.4 | 12.4 | 2.4 | 0.2 | athyreosis |
| HD-7 | female | 100 | >100 | 1.13 | 8.1 | 0.93 | 65 | hypoplasia |
| HD-8 | female | uk | uk | uk | uk | uk | uk | athyreosis |
| HD-9 | female | 350 | 708 | uk | uk | 3.4 | 37.5 | athyreosis |
| HD-10 | male | uk | uk | uk | uk | uk | uk | hypoplasia |
| HD-11 | female | 302 | >150 | 0.4 | <5 | 2.7 | 0.18 | athyreosis |
| HD-12 | female | 330 | 150 | 0.6 | 2.5 | 3 | 358.4 | Normal thyroidea |
| HD-13 | female | 2100 | 36 | 0.4 | 1.6 | 0 | uk | uk |
| HD-14 | male | 98 | 63.7 | 1.5 | 9.3 | uk | 5.7 | hypoplasia |
| HD-15 | female | 100 | 95 | 1.3 | 1.7 | uk | uk | uk |
| HD-16 | female | 238 | >50 | 1.3 | 1.7 | 0.4 | <0.2 | thyreosis |
| HD-17 | male | 85.6 | uk | uk | uk | uk | uk | athyreosis |
| HD-18 | female | 498 | >50 | 2.7 | 1.3 | 0.4 | 0.2 | athyreosis |
| HD-19 | female | 242 | >80 | 1.51 | 5.3 | 0.7 | uk | hypoplasia |
| HD-20 | male | >50 | >50 | 0.9 | 4.3 | 0.7 | uk | athyreosis |
| HD-21 | female | 177 | 41.4 | 0.9 | 2.5 | uk | uk | athyreosis |
| HD-22 | female | uk | >60 | 0.15 | 7.5 | 0.01 | uk | uk |
| HD-23 | female | uk | >48 | 1.6 | 1.3 | 0.4 | uk | struma |
| HD-24 | male | 16.7 | 5.5 | 2.2 | 16.4 | 1.9 | uk | Normal thyroidea |
| HD-25 | female | 15.5 | 12.3 | 2.9 | 15 | 1.4 | uk | Normal thyroidea |
| HD-26 | female | 59 | >50 | 4.5 | 7.8 | 1.4 | uk | uk |
| HD-27 | female | 194 | >50 | 1.2 | 5.9 | 0.7 | 64.8 | uk |
| HD-28 | female | 203 | 470 | uk | uk | uk | uk | athyreosis |
| HD-29 | male | 297 | >50 | 0.7 | <2.5 | 0.3 | uk | athyreosis |
| HD-30 | female | 265 | >50 | 1.7 | 4.6 | 0.7 | 74.3 | hypoplasia |
| HD-31 | female | 27 | 80 | uk | uk | uk | 2.6 | athyreosis |
| HD-32 | female | 238 | 50 | 0.5 | 2.5 | 0.3 | uk | athyreosis |
| HD-34 | male | uk | uk | uk | uk | uk | uk | hypoplasia |
| HD-35 | female | 79 | 148 | 2.02 | 7.4 | 1.1 | uk | hypoplasia |
| HD-36 | male | elevated | uk | uk | uk | uk | uk | Normal thyroidea |
| HD-37 | female | uk | 94.5 | 1.1 | 3.5 | 0.8 | uk | uk |
| HD-38 | male | uk | 22.3 | 3.5 | 2.6 | 0.5 | uk | struma |
| HD-39 | male | 76.5 | 48.8 | 0.9 | 23 | 0.3 | uk | hypoplasia |
| HD-40 | male | uk | 27.9 | 0.9 | 1.3 | 0.5 | uk | athyreosis |
| HD-41 | female | elevated | >50 | 1.2 | 2.4 | 0.5 | uk | athyreosis |
| HD-42 | male | uk | uk | uk | uk | uk | <1.6 | athyreosis |
| HD-43 | male | 164 | 150 | 0.2 | <0.5 | <0.1 | uk | Normal thyroidea |
| HD-44 | male | 95 | uk | uk | uk | uk | uk | hypoplasia |
| HD-45 | female | 20.1 | 44.7 | 1.7 | 7 | 0.9 | 24.4 | hypoplasia |
| HD-46 | male | uk | 20.3 | uk | uk | uk | uk | Normal thyroidea |
| HD-47 | male | uk | 8.2 | uk | uk | 0.4 | uk | Normal thyroidea |
| HD-48 | male | 239 | >150 | 0.46 | <0.5 | 0.17 | uk | uk |
| HD-49 | male | elevated | uk | uk | uk | uk | uk | uk |
| HD-50 | female | 235 | >150 | 1.3 | 4.8 | 0.5 | uk | hypoplasia |
| HD-51 | female | elevated | 83.8 | 2.4 | 8.8 | 0.009 | uk | athyreosis |
| HD-52 | male | uk | uk | uk | uk | uk | uk | athyreosis |
| HD-53 | female | uk | 100 | 1.1 | 1.9 | 0.3 | uk | ectopia |
| HD-54 | female | 444 | n.d | 0.5 | 0.5 | 0.1 | <0.15 | athyreosis |
| HD-55 | male | uk | >150 | 1.01 | 1.5 | 0.36 | uk | Normal thyroidea |
| HD-56 | female | 159 | >50 | 0.9 | 2.1 | 0.6 | uk | hypoplasia |
| HD-57 | male | uk | uk | uk | uk | uk | uk | hypoplasia |
| HD-58 | female | 137 | >50 | 0.57 | 0.9 | 0.26 | uk | athyreosis |
| HD-59 | male | 135 | >150 | 0.8 | 3.3 | 0.4 | uk | hypoplasia |
| HD-60 | female | 97 | 94 | 1.3 | 34 | 0.17 | 2.7 | uk |
| HD-61 | male | 107 | 63.4 | 0.75 | 4.5 | 0.68 | uk | hypoplasia |
| HD-62 | male | uk | 291 | uk | uk | 4.8 | uk | athyreosis |
| HD-63 | male | 556 | 472 | 0.3 | uk | <0.4 | 0.54 | athyreosis |
| HD-65 | female | 72 | >25 | uk | uk | uk | uk | ectopia |
| HD-66 | male | uk | uk | uk | uk | uk | uk | hypoplasia |
| HD-67 | female | 48 | uk | uk | uk | uk | uk | uk |
| HD-68 | female | uk | uk | uk | 6.24 | 3.18 | uk | athyreosis |
| HD-69 | female | >50 | uk | 4.5 | 7.8 | 1.4 | uk | struma |
| HD-70 | male | >50 | uk | uk | uk | uk | uk | ectopia |
| HD-71 | male | 221 | 273 | uk | uk | uk | uk | hypoplasia |
| HD-72 | female | 279 | uk | uk | uk | uk | uk | athyreosis |
| HD-73 | male | uk | 28.5 | uk | uk | 4.9 | uk | hypoplasia |
| HD-74 | female | >50 | uk | 24 | uk | 0.4 | uk | hypoplasia |
| HD-75 | male | uk | >50 | uk | uk | 12.2 | 12.8 | athyreosis |
| HD-77 | female | uk | >48 | 0.5 | <2.6 | uk | <0.3 | athyreosis |
| HD-78 | male | uk | 83.4 | uk | 8.3 | uk | uk | athyreosis |
| HD-79 | male | 178 | 267 | 3.11 | 0.9 | uk | uk | athyreosis |
| HD-80 | female | 234 | 241 | uk | uk | uk | 134 | hypoplasia |
| HD-81 | female | n.d | n.d | uk | uk | uk | uk | athyreosis |
| HD-82 | female | 172 | >150 | 1.2 | 5.6 | 0.9 | 0.5 | athyreosis |
| HD-84 | female | uk | uk | uk | uk | uk | uk | hypoplasia |
| HD-85 | male | 137 | >100 | 142 | 10.4 | uk | 23.1 | ectopia |
| HD-86 | female | >100 | 100 | 92.6 | 1.11 | uk | 2298 | uk |
| HD-87 | female | >250 | 1366 | 130 | 4.9 | uk | 119 | athyreosis |
| HD-88 | female | 177 | 188 | uk | uk | uk | uk | athyreosis |
| HD-89 | female | 200 | 40.3 | uk | uk | uk | uk | athyreosis |
| HD-90 | female | >220 | 70.1 | uk | uk | uk | <1 | athyreosis |
| HD-91 | male | uk | uk | uk | uk | uk | uk |  |
| HD-92 | male | uk | 4.56 | 6.8 | 11.3 | uk | uk | hypoplasia |
| HD-93 | male | uk | uk | uk | uk | uk | uk | hypoplasia |
| HD-94 | female | >100 | >50 | 0.9 | 0.8 | 0.3 | uk | hypoplasia |
| HD-95 | female | 90.5 | 100 | 156 | 11.1 | 3.31 | 44.2 | uk |
| HD-96 | female | 296 | >150 | 0.9 | 2.5 | 0.3 | uk | uk |
| Hd-97 | female | 227.4 | uk | uk | 2.95 | uk | uk | hypoplasia |
| HD-98 | female | 229 | uk | uk | uk | uk | uk | athyreosis |
| HD-99 | female | 113.6 | >200 | 0.8 | 1.8 | 0.4 | uk | hypoplasia |
| HD-100 | male | 19.2 | 176 | uk | 3.12 | uk | 1.3 | uk |
| HD-101 | female | uk | 178.6 | uk | 6 | uk | uk | athyreosis |
| HD-102 | male | 217 | >50 | uk | uk | uk | uk | athyreosis |
| HD-103 | male | 85.6 | uk | uk | uk | uk | uk | athyreosis |
| HD-104 | male | 411 | uk | uk | uk | uk | uk | hypoplasia |
| HD-105 | male | 224 | 217 | uk | uk | 0.4 | 24 | hypoplasia |
| HD-106 | male | 360 | 489 | uk | uk | uk | <1 | athyreosis |
| HD-107 | male | uk | uk | uk | uk | uk | uk | uk |
| HD-108 | female | uk | uk | uk | uk | uk | uk | uk |
| HD-109 | female | uk | uk | uk | uk | uk | uk | uk |
| HD-110 | female | 250 | 240 | 0.55 | uk | 0.28 | 43 | hypoplasia |
| HD-111 | female | 178 | >50 | 0.7 | <2.5 | <0.3 | uk | uk |
| HD-112 | female | 208 | >150 | 0.6 | 12 | 2.6 | uk | uk |
| HD-113 | male | 315 | uk | uk | uk | uk | uk | athyreosis |
| HD-114 | female | >100 | >50 | 0.8 | uk | 0.5 | uk | athyreosis |
| HD-115 | female | 272 | 180 | uk | uk | uk | uk | athyreosis |
| HD-116 | female | 286 | <150 | 0.6 | 10.2 | 2.8 | 342 | hypoplasia |
| HD-117 | female | 205 | 371 | 0.4 | 1.5 | uk | uk | hypoplasia |
| HD-118 | female | 342 | >150 | 1.4 | 75.3 | 9.6 | 2.7 | hypoplasia |
| HD-119 | female | 248 | >150 | 0.8 | 2.7 | 0.3 | 2.6 | hypoplasia |
| HD-120 | male | uk | uk | uk | uk | uk | uk | hypoplasia |
| HD-121 | female | uk | uk | uk | uk | uk | uk | athyreosis |
| HD-122 | male | 262 | >150 | 1 | 2.5 | 3.4 | 3.4 | athyreosis |
| HD-123 | female | 25.8 | 28.7 | 2.5 | 13 | 17 | uk | hypoplasia |
| HD-124 | male | 227 | >150 | 1.09 | 70.2 | 9.26 | uk | uk |
| HD-125 | female | elevated | 92.4 | 3 | 5 | 4.4 | uk | uk |
| HD-126 | male | >250 | 40 | 0.62 | uk | 3.5 | uk | athyreosis |
| HD-127 | female | elevated | 699 | uk | uk | uk | uk | athyreosis |
| HD-128 | female | <150 | 60 | uk | uk | 6.1 | 251 | hypoplasia |
| HD-129 | female | elevated | 52.3 | uk | uk | uk | uk | hypoplasia |
| HD-130 | male | 187 | 246 | 1.7 | 7.3 | 7.3 | uk | hypoplasia |
| HD-131 | male | 41.9 | 46.2 | 2 | uk | 12.3 | uk | Normal thyroidea |
| HD-133 | male | 60.6 | 39.2 | 0.9 | 22.4 | 8 | 3.4 | hypoplasia |
| HD-135 | female | 191 | >150 | 1.24 | 49 | 7.43 | 71 | Normal thyroidea |
| HD-136 | female | 23.9 | 53.8 | 1.7 | 103.6 | 13.1 | 80.7 | hypoplasia |
| HD-137 | female | uk | 343.8 | uk | uk | uk | uk | athyreosis |
| HD-138 | male | 238 | >150 | 1.3 | 30.6 | 4.9 | 46.9 | hypoplasia |
| HD-139 | female | 258 | >150 | 0.86 | 32.2 | 6.15 | <250 | ectopia |
| HD-140 | male | 134 | uk | uk | uk | uk | 5.8 | hypoplasia |
| HD-141 | male | 147 | uk | uk | uk | uk | <0.15 | athyreosis |
| HD-142 | male | uk | 8.6 | uk | uk | uk | uk | hypoplasia |
| HD-143 | male | uk | uk | uk | uk | uk | uk | uk |
| HD-144 | male | 236 | 561 | uk | uk | 0.26 | 3.8 | athyreosis |
| HD-145 | female | 264 | 590.8 | uk | uk | 12 | 3.9 | hypoplasia |
| HD-146 | male | 29 | 31.79 | 3.4 | 166 | 16.15 | uk | athyreosis |
| HD-147 | female | 146 | 482 | uk | uk | 3.11 | uk | hypoplasia |
| HD-148 | female | uk | uk | uk | uk | uk | uk | uk |
| HD-149 | female | uk | uk | uk | uk | uk | uk | uk |
| HD-150 | male | uk | uk | uk | uk | uk | uk | uk |
| HD-153 | male | 321 | 722.3 | 1.2 | 28.9 | 3.9 | 31.8 | hypoplasia |
| HD-154 | female | uk | uk | uk | uk | uk | uk | uk |
| HD-155 | female | 205 | 612.9 | uk | uk | 2.7 | <0.8 | athyreosis |
| HD-156 | male | 143 | >150 | 1 | 20.6 | 3.9 | 13 | athyreosis |
| HD-157 | female | 145 | 100 | 0.9 | 2.2 | 2.7 | uk | athyreosis |
| HD-158 | female | uk | uk | uk | uk | uk | uk | uk |
| HD-159 | male | uk | uk | uk | uk | uk | uk | hypoplasia |
| HD-160 | male | uk | uk | uk | uk | uk | uk | Normal thyroidea |
| HD-161 | male | 238 | >150 | 1.3 | 30.6 | 4.9 | 46.9 | athyreosis |
| HD-162 | female | uk | uk | uk | uk | uk | uk | athyreosis |
| HD-163 | male | uk | uk | uk | uk | uk | uk | Normal thyroidea |
| HD-164 | female | 159 | >150 | 0.6 | 18.9 | 5.2 | <0.15 | athyreosis |
| Mz1 | male | uk | 185 | uk | uk | <3.9 | 9 | athyreosis |
| Mz2 | male | elevated | elevated | uk | uk | 0.81 | uk | Normal thyroidea |
| Mz3 | male | uk | 81.7 | uk | uk | 0.48 | uk | athyreosis |
| Mz4 | male | uk | 75 | <40 | <30 | uk | uk | athyreosis |
| Mz5 | female | uk | 45 | uk | n.d | 1.1 | 231 | Normal thyroidea |
| Mz6 | male | uk | 479 | uk | uk | 3 | 9.3 | Normal thyroidea |
| Mz7 | female | uk | elevated | uk | uk | uk | uk | ectopia |
| Mz8 | female | uk | 321 | uk | uk | 0.26 | 10 | hypoplasia |
| Mz9 | male | uk | 324 | uk | uk | 1.6 | <0.2 | athyreosis |
| Mz10 | female | uk | elevated | uk | uk | 9.3 | 1.3 | athyreosis |
| Mz11 | female | uk | 224 | 0.7 | 0.7 | uk | 2.2 | athyreosis |
| Mz12 | female | uk | 129 | uk | uk | 9.1 | uk | athyreosis |
| Mz13 | female | uk | 396 | 2.3 | 0.4 | uk | 9.6 | athyreosis |
| Mz14 | female | uk | 549. | uk | uk | 2.1 | 4.8 | hypoplasia |
| Mz15 | female | uk | uk | uk | uk | uk | uk | athyreosis |
| Mz16 | female | uk | 170 | uk | uk | 0.9 | 2 | athyreosis |
| Mz17 | female | uk | 190 | n.d | n.d | <0.4 | 3.7 | athyreosis |
| Mz18 | male | uk | uk | uk | uk | uk | uk | uk |
| Mz19 | female | uk | >100 | uk | uk | 2.8 | 2.6 | athyreosis |
| Mz20 | female | uk | >150 | uk | uk | uk | uk | athyreosis |
| Mz21 | female | uk | 100 | uk | uk | uk | uk | athyreosis |
| Mz22 | male | uk | 224 | uk | uk | 1.4 | uk | athyreosis |
| Mz23 | male | uk | uk | uk | uk | uk | uk | hypoplasia |