Construction of a square with area that of a given triangle

Given triangle ABC, draw perpendicular lines AD' and D'B and CE' meeting D'B at point P to get a rectangle, AD'PC, with twice the area of triangle ABC.

Area = \( \frac{bh}{2} \)

Now bisect AD' to get a rectangle of area one-half bh.

Suppose that rectangle EFGH is our rectangle above. Extend EH to EI, so that HI = HG.

The triangle EHQ is similar to the triangle OQI, because both are right triangles and angle EQI is inscribed in half a circle and so is a right angle. This means that angle EQH equals angle QIH and angle HEQ equals angle HQI.

So \( \frac{EH}{HQ} = \frac{HQ}{HI} \), so \( bh/2 = FG \times GH = EH \times HI = HQ \times HQ \).