$$a(x) = f(x) \cdot e(x)$$
$$= f(x) \cdot [h(x) \cdot r(x) + m(x)]$$
$$= f(x) \cdot h(x) \cdot r(x) + f(x) \cdot m(x)$$
$$= f(x) \cdot \frac{g(x)}{f(x)} \cdot r(x) + f(x) m(x)$$
$$= g(x) r(x) + f(x) m(x)$$

$\because$ $g(x) = p g_0(x) \equiv 0 \ (\text{mop } p)$

$f(x) = 1 + p f_0(x) \equiv 1 \pmod q$

$$\therefore \ a(x) = p g_0(x) r(x) + [1 + p f(x)] m(x)$$
$$= p g_0(x) r(x) + m(x) + p f(x) m(x)$$

$\therefore$ $a(x) = m(x) \pmod q$

Since q is sufficiently large

$a(x) = m(x)$