Let $p$ be a prime number, let $q = p^{2r}$, and let $\mathbb{F}_{q^k}$ denote the finite field of order $q^k$. In case that $d$ divides $p^r + 1$, Jacques Wolfmann [J. Number Theory 42 (1992), no. 3, 247–257; MR1189504 (94j:1055)] computed the number $N_{b,k,s}$ of points on the diagonal hypersurface in $\mathbb{F}_{q^k}$ $(s \geq 2)$ given by $x_1^d + \cdots + x_s^d = b$ for any $b \in \mathbb{F}_{q^k}$. It turns out that there are only three cases: the homogeneous case $b = 0$ and two inhomogeneous cases depending on whether $b^{q^k - 1} = 1$ or $\neq 1$.

In the paper under review the authors derive formulas relating the number of points of the three corresponding varieties. Moreover, a simplified expression is obtained for the zeta function recording the number of points on the associated projective variety of a smooth irreducible diagonal hypersurface of degree $d$ in the case that $d$ divides $p^r + 1$. Finally, the Hermitian case $d = p^r + 1$ and its consequences for coding theory are discussed.