

Introduction

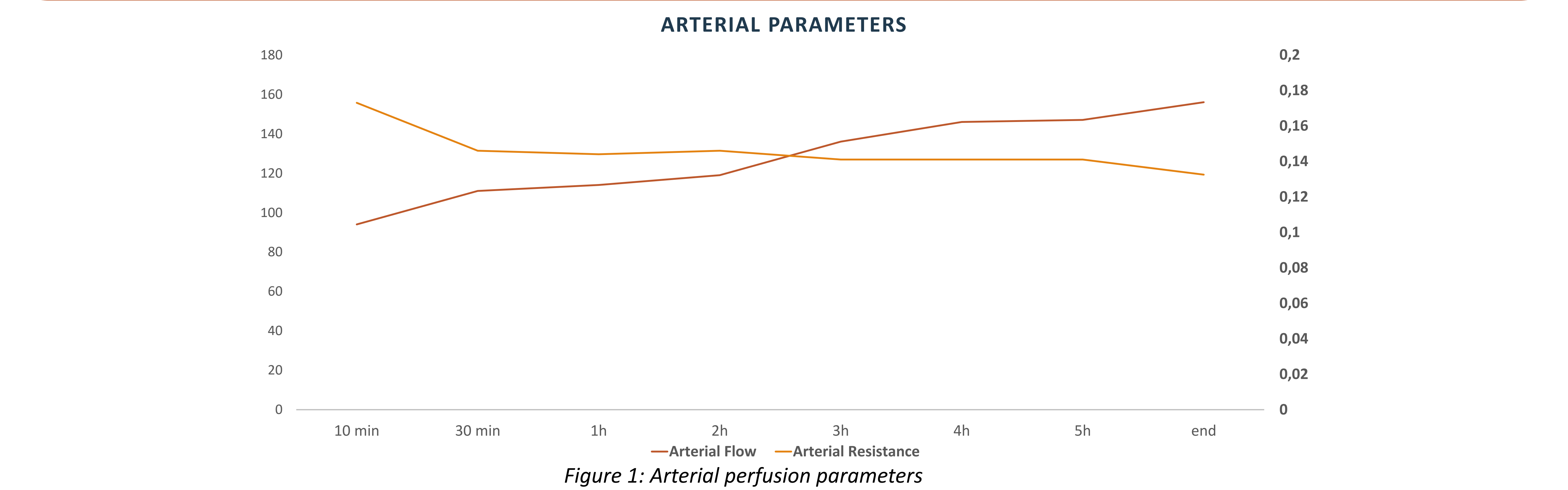
Machine perfusion plays a crucial role in organ transplantation, particularly in Donation after Circulatory Death (DCD). DCD organs are vulnerable to ischemic injury due to warm ischemia time between circulatory arrest and organ retrieval. This technology enhances organ preservation, reduces ischemic damage, and improves post-transplant outcomes.

Methods

In Italy, the DCD procedure is meticulously structured to ensure ethical integrity, legal compliance, and optimal organ viability. Between 2024 and May 2025, 18 DCD cases were reported, with 17 confirmed at the liver transplant center of the Azienda Ospedaliero-Universitaria delle Marche in Ancona. All DCD livers underwent ex-situ machine perfusion using the PerLife[®] system (Aferetica Srl).

Results

Seventeen livers were perfused using Dual Hypothermic Oxygenated Perfusion (DHOPE). The mean perfusion duration was 106 minutes (min 33, max 847), at an average temperature of 7°C. Arterial (Figure 1) and portal vein flows increased during the procedure, indicating successful graft reconditioning. The median post-transplant peak AST was 1282 (range 144-6000), while ALT was 1104 (range 131-3300). This approach reduces the ischemic injury of the grafts, improves preservation quality, and allows clinicians to monitor organ viability in real time. This method represents a significant improvement in the preservation of DCD livers, helping to reduce early allograft dysfunction and potentially expand the donor pool.



Conclusion

Marginal organ donation is increasingly becoming standard practice in transplant programs. The combination of normothermic regional perfusion (NRP) and machine perfusion (MP) has become essential in DCD organ transplantation, contributing to the increased utilization of DCD organs across Italy. Machine perfusion technology is transforming DCD organ transplantation by enhancing preservation, reducing ischemic damage, and enabling real-time viability assessment. This technology not only helps recondition the grafts but also provides valuable information regarding organ viability before transplantation, ultimately improving transplant outcomes and expanding the donor pool.