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Association Between Sheath Use and Clinical Variables in Lead Extractions: A Retrospective Observational Study

Antonio Felipe Leite Simão[1], Antonio Fernandes Silva e Sousa Neto[1], Stela Maria Vitorino Sampaio[1,*], Amanda Sobreira de Brito[1], Recio Cronemberger Mangueira[1], Daniel Francisco de Mendonça Trompieri[1], Marcos Aurelio Barboza de Oliveira[1], Isabel Cristina Leite Maia[1]

Introduction: The number of implantable cardiac electronic devices and their associated complications has increased in recent years. Consequently, transvenous lead extraction has become increasingly necessary, particularly in cases of infection, lead dysfunction, or lead burden. **Objective:** To evaluate the association between sheath use in transvenous lead extractions and variables such as procedure indication, lead dwell time, and clinical outcomes. **Methods:** This was a retrospective observational study conducted at a public hospital in Fortaleza, Brazil, including patients who underwent lead removal or extraction between 1998 and 2025. The following variables were analyzed: indication for the procedure, lead dwell time, materials used, outcomes, complications, mortality, and access route. Data were tabulated in Microsoft Excel, and statistical analysis was performed in SPSS using chi-square and Wald tests at the 5% significance level. **Results:** The mean age of patients was 62.16 years. The main indications for lead removal or extraction were lead dysfunction and infection, followed by lead burden. The mean dwell time of the removed leads was 8.53 years. Procedure-related complications were rare. Infection as an indication was more frequently associated with no need for sheath use (68.8%) than with sheath use (23.5%) ($p < 0.001$), with an odds ratio (OR) of 0.139 (95% CI: 0.071–0.276), indicating a lower likelihood of sheath use in these cases. Lead dysfunction was significantly more associated with sheath use than with non-use, with an OR of 4.810 (95% CI: 2.393–9.672; $p = 0.012$). Lead burden was also significantly associated with sheath use ($p = 0.012$), being more frequent in procedures performed with a sheath than without, yielding an OR of 3.005 (95% CI: 1.238–7.292). The mean lead dwell time was longer in cases with sheath use (8.63 ± 7.55 years) than in cases without sheath use (5.41 ± 3.90 years), although this difference did not reach statistical significance ($p = 0.153$). Regarding outcomes, procedural success rates were high in both groups (89.3% with sheath use and 92.7% without sheath use), with no statistically significant difference ($p = 0.411$), suggesting that sheath use was appropriately indicated. **Conclusions:** Sheath use in transvenous lead extraction was associated with more complex cases, particularly those involving lead dysfunction, multiple leads, and longer lead dwell time. Infections were predominantly managed using alternative techniques. The procedures demonstrated high success rates and low complication rates, highlighting the safety of institutional practice. These findings reinforce the importance of prior clinical assessment to guide the selection of the most appropriate extraction technique.

1. Hospital do Coração de Messejana – Fortaleza (CE), Brazil.
***Correspondence author:** stelavsampaio@terra.com.br