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Complications of renal cryoablation: a single center experience

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Purpose: We describe perioperative complications associated with renal cryoablation and identify potential risk factors for certain complications.

Materials and Methods: We retrospectively analyzed the medical records of patients with unifocal renal masses treated with cryosurgery at a single center between 1997 and 2007. All complications associated with these procedures were documented and classified into grades 1 to 5 by the Clavien surgical complication classification. In-depth analysis was done to identify potential risk factors for the most common complications.

Results: We evaluated 101 percutaneous, 52 laparoscopic and 9 open procedures. Complications were noted in 38 procedures (23.5%), including grades 1 to 4 in 19 (11.7%), 8 (4.9%), 5 (3.1%) and 6 (3.7%), respectively, as the severest complication. The most common complication was flank pain (11 procedures), followed by perinephric hematoma and cardiovascular complications (10 each). Mass size ($p = 0.001$), number of cryoablation probes ($p < 0.001$) and chronic anticoagulation ($p < 0.05$) were associated with an increased incidence of significant hematoma. Cardiovascular complications were more common when upper pole lesions were treated, and when an open approach was used (each $p < 0.05$). Respiratory complications occurred in 7 procedures and were associated with patient age ($p < 0.05$) and mass size ($p < 0.01$).

Conclusions: Cryoablation is a relatively safe procedure with a low complications rate in properly selected patients. We identified potential risk factors that may help identify patients most at risk for certain complications and consequently assist in preprocedural planning and counseling.

Editorial Comment

The management of small renal masses has evolved from total removal of the kidney to nephron-sparing surgery. Recently, renal cryoablation has emerged as a new treatment modality for small renal cancer. Although long-term results have not been established yet, it is clear that this novel surgical modality reveals low complication rates when compared to other minimally invasive surgery for management of small renal masses.

Complications were noted in 38 procedures (23.5%) from a total of 162 procedures, including 101 percutaneous, 52 laparoscopic and 9 open procedures. The complications were graded from 1 to 4 in 19 (11.7%), 8 (4.9%), 5 (3.1%) and 6 (3.7%), respectively, as the severest complication.

Interestingly, cardiovascular complications were more common when upper pole lesions were treated, and when an open approach was used (each $p < 0.05$); while respiratory complications occurred in 7 procedures and were associated with patient age ($p < 0.05$) and mass size ($p < 0.01$).

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