

# Acute Cholecystitis in Patients on Dialysis: A Nationwide Population-based Cohort Study in Korea

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# Aims

- Determine the incidence and risk of acute cholecystitis requiring cholecystectomy in the dialysis population
- Investigate the clinical characteristics and differences among the dialysis modalities in patients with end-stage renal disease (ESRD)

# Methods

- The data on patients undergoing dialysis were obtained from the National Health Information database
- All incidental patients with ESRD who underwent dialysis for more than 3 months and were diagnosed between 2004 and 2013 in Korea
- The control cohort was selected from the KNHIS NSC that consisted of both healthy individuals and patients, including those with chronic kidney disease, ESRD, and transplantation
- The incidence of acute cholecystitis was investigated using ICD-10 codes

# Characteristics of the dialysis patients and controls

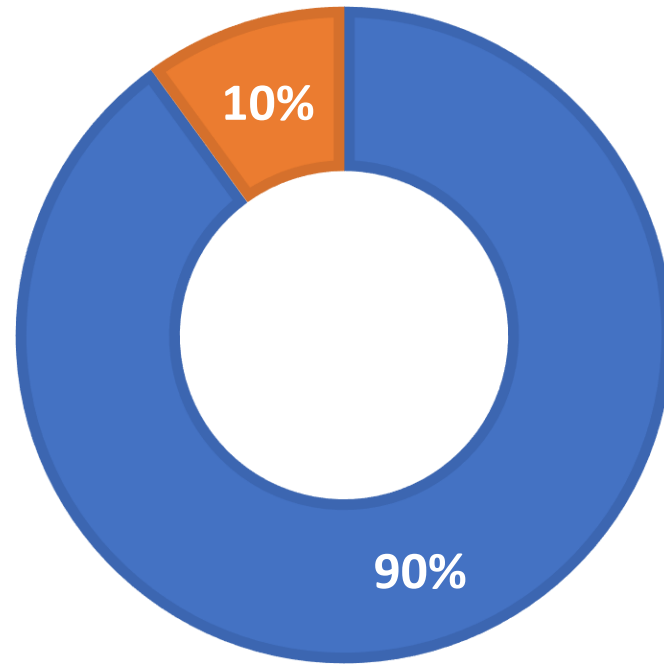
| Characteristics | Dyalysis patients, No. (%)<br>(n=59,999) | Controls, No. (%)<br>(n=59,999) | <i>P</i> value |
|-----------------|--|---------------------------------|----------------|
| Sex             |  |                                 | <0.0001        |
| Male            | 34,772 (58)                              | 31,838 (53.1)                   |                |
| Female          | 25,227 (42.1)                            | 28,161 (47)                     |                |
| Income level    |  |                                 | <0.0001        |
| Low             | 23,301 (38.9)                            | 17,210 (28.7)                   |                |
| Middle          | 18,446 (30.8)                            | 21,472 (35.8)                   |                |
| High            | 18,252 (30.5)                            | 21,317 (35.6)                   |                |
| CCI score       |  |                                 | <0.0001        |
| 1               | 6,400 (10.7)                             | 5,326 (8.9)                     |                |
| 2               | 6,332 (10.6)                             | 5,611 (9.4)                     |                |
| 3               | 47,267 (78.8)                            | 49,062 (81.8)                   |                |

# Characteristics of the dialysis patients and controls

| Comorbidities               | Dyalysis patients, No. (%)<br>(n=59,999) | Controls, No. (%)<br>(n=59,999) | <i>P</i> value |
|-----------------------------|--|---------------------------------|----------------|
| Diabetes mellitus           | 43,591 (72.7)                            | 43,062 (71.8)                   | <0.0001        |
| Hypertension                | 53,253 (88.8)                            | 55,006 (91.7)                   | 0.0005         |
| Hyperlipidemia              | 40,773 (68)                              | 42,083 (70.2)                   | 0.0006         |
| Connective tissue disease   | 53,04 (8.9)                              | 10,172 (17)                     | <0.0001        |
| Myocardial infarction       | 6,877 (11.5)                             | 6,211 (10.4)                    | <0.0001        |
| Heart failure               | 19,470 (32.5)                            | 15,240 (25.5)                   | <0.0001        |
| Peripheral vascular disease | 18,687 (31.2)                            | 27,393 (45.7)                   | <0.0001        |
| Severe liver disease        | 2,016 (3.4)                              | 2,424 (4.1)                     | <0.0001        |
| Dementia                    | 3,495 (5.9)                              | 9,591 (16)                      | <0.0001        |
| Atrial fibrillation         | 3,637 (6.1)                              | 4,685 (7.9)                     | <0.0001        |

# Dialysis modality

■ Hemodialysis ■ Peritoneal dialysis



# Characteristics of the cholecystitis cases among the dialysis patients and controls

| Characteristics |        | Dialysis patients<br>(n=59,999) |         |    | Controls<br>(n=59,999) |         |    | IRR (95% CI)     |
|-----------------|--------|---------------------------------|---------|----|------------------------|---------|----|------------------|
|                 |        | No. (%)                         | PY      | IR | No. (%)                | PY      | IR |                  |
| All             |        | 3940 (8.2)                      | 205,456 | 19 | 647 (1.4)              | 271,419 | 2  | 8.04 (7.40-8.76) |
| Sex             | Male   | 2298 (4.8)                      | 117,146 | 20 | 370 (0.8)              | 140,807 | 3  | 7.47 (6.69-8.35) |
|                 | Female | 1642 (3.4)                      | 88,310  | 19 | 277 (0.6)              | 130,612 | 2  | 8.77 (7.71-9.99) |

PY, person-years; IR, incidence ratio; IRR, incidence rate ratio; CI, confidence interval



|                            | All cases<br>(n) | Cholecystitis cases<br>(n, %) | Crude HR (95%<br>CI) | Adjusted HR (95%<br>CI) |
|----------------------------|------------------|-------------------------------|----------------------|-------------------------|
| <b>Type of dialysis</b>    |                  |                               |                      |                         |
| <b>No dialysis</b>         | 59,999           | 647 (1.1)                     | 1.00                 | 1.00                    |
| <b>Hemodialysis</b>        | 54,103           | 3558 (6.6)                    | 8.83 (8.08-9.64)     | 8.01 (7.36-8.71)        |
| <b>Peritoneal dialysis</b> | 5,896            | 382 (6.5)                     | 10.23 (8.98-11.66)   | 9.14 (8.05-10.37)       |

# Key messages

- Patients with ESRD undergoing dialysis were associated with an 8,91-fold higher risk of acute cholecystitis than the matched control group
- Percutaneous cholecystitis is a option for the bridging method or palliative treatment