

# Survival Outcomes in Patients undergoing Liver Transplantation for Primary Sclerosing Cholangitis and Incidental Cholangiocarcinoma

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## INTRODUCTION

Primary sclerosing cholangitis (PSC) is a leading indication for liver transplantation (LT) in Europe. Approximately 15% of PSC patients develop cholangiocarcinoma (CCA);<sup>1</sup> 50% of these are diagnosed at an advanced stage where no treatment options are available.<sup>2</sup>

Incidental CCAs (iCCA) are found in 3-21% of explant specimens, emphasizing the shortfalls of current diagnostic modalities in detecting CCA, especially in its early stages.<sup>1</sup>

At present, CCA is a contraindication to transplantation in the UK. However, emerging evidence has showcased continuous improvement in outcomes of surgical resection and LT for early CCA.<sup>3,4</sup> A consensus statement in 2020 recommended that LT is a potentially curative option for intrahepatic CCA and must be considered for patients with cirrhosis and CCA  $\leq 2$  cm.<sup>2</sup>

## AIM

This study aims to compare survival outcomes of patients undergoing LT for PSC and iCCA, to patients with PSC and CCA who do not undergo LT.

## METHODS

Retrospective cohort study conducted across a high-volume, dedicated autoimmune liver disease unit in the United Kingdom.

Three data registries were interrogated and cross-referenced across the following groups:

- All patients diagnosed with PSC
- All patients diagnosed with CCA (with or without PSC)
- All LT recipients

**Inclusion criteria:** all patients diagnosed with PSC and CCA between January 1<sup>st</sup> 1981 and December 31<sup>st</sup> 2021.

Statistical analysis was conducted using SPSS (IBM SPSS Statistics for Macintosh, Version 29.0. Armonk, NY: IBM Corp), and a significance threshold of  $<0.05$  was used.

**Ethical approval:** not required for this study as it constituted a service evaluation with no identifiable patient data. Local governance approval was obtained.

## RESULTS

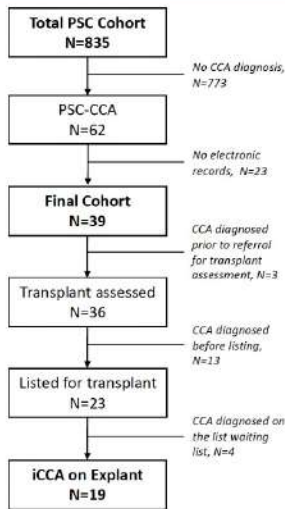


Figure 1. Consort diagram of study patient inclusion.

Between January 1<sup>st</sup> 1981 and December 31<sup>st</sup> 2021, 835 patients with PSC attended our unit.

39 patients (4.7%) were diagnosed with CCA.

- 76.9% are male
- Median age at PSC diagnosis: 53 (range 24-66)
- Concomitant diagnosis of inflammatory bowel disease (IBD) in 69.2%.
- 41% had evidence of cirrhosis on biopsy or explant histology

19 PSC patients (48.7%) underwent LT and had an incidental diagnosis of CCA.

- Hilar CCA: 47.4%
- Intrahepatic CCA: 21.1%
- Perihilar CCA: 10.5%

52.6% had recurrent CCA post-transplantation.

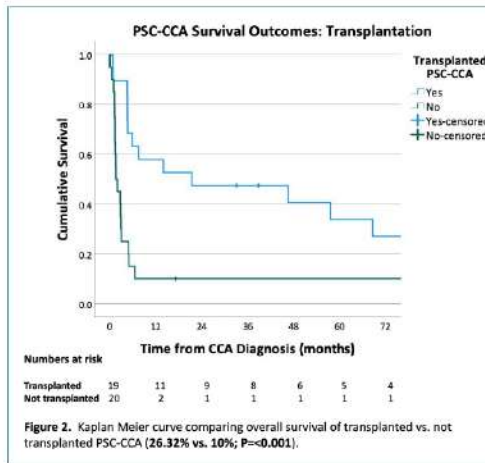


Figure 2. Kaplan Meier curve comparing overall survival of transplanted vs. not transplanted PSC-CCA (26.32% vs. 10%;  $P=0.001$ ).

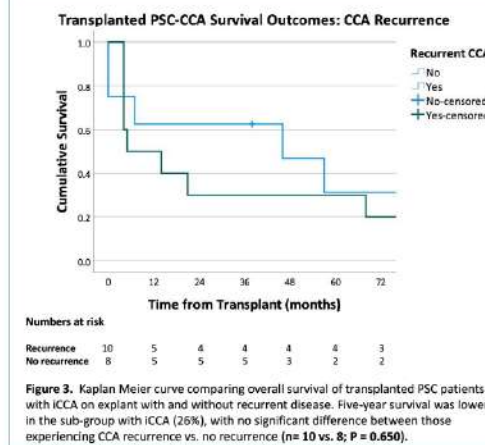


Figure 3. Kaplan Meier curve comparing overall survival of transplanted PSC patients with iCCA on explant with and without recurrent disease. Five-year survival was lower in the sub-group with iCCA (26%), with no significant difference between those experiencing CCA recurrence vs. no recurrence ( $n=10$  vs.  $8$ ;  $P=0.650$ ).

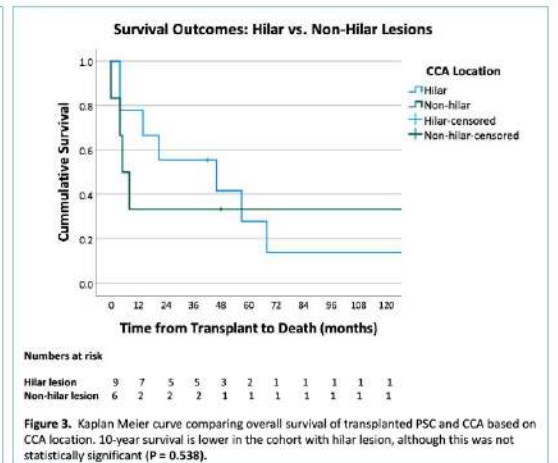


Figure 3. Kaplan Meier curve comparing overall survival of transplanted PSC and CCA based on CCA location. 10-year survival is lower in the cohort with hilar lesion, although this was not statistically significant ( $P=0.538$ ).

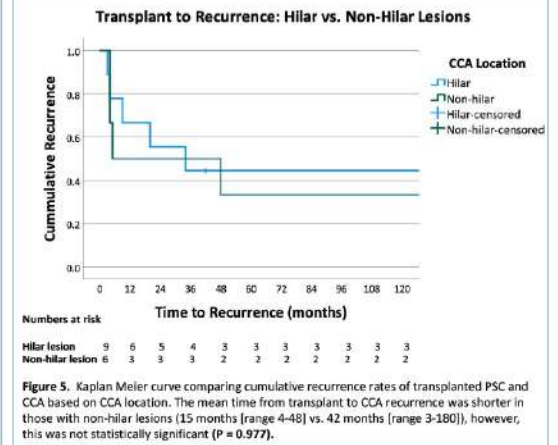


Figure 5. Kaplan Meier curve comparing cumulative recurrence rates of transplanted PSC and CCA based on CCA location. The mean time from transplant to CCA recurrence was shorter in those with non-hilar lesions (15 months [range 4-48] vs. 42 months [range 3-180]), however, this was not statistically significant ( $P=0.977$ ).

## CONCLUSION

We find that survival in PSC-CCA is greater among liver transplant recipients vs. those not transplanted. However post-LT outcomes remain poor, with fewer than 50% of patients surviving at 5 years. We did not find a significant difference in survival outcomes or time to recurrence based on CCA location, however our findings are confounded by our small sample size. Improved screening tools for CCA detection are needed for patients with PSC undergoing liver transplantation.

## REFERENCES

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