

INTRODUCTION

There are no reports of long term outcomes of Hepatitis C (HCV) liver transplant (LTx) recipients in the direct-acting antiviral (DAA) era. We aimed to examine impact of DAA's on survival, examine the populations at risk, cure rates, and long term outcomes.

- ❖ We hypothesized that survival of Hepatitis C patients has improved over the last decade, last eras of transplantation, and since creation of specialized Hepatitis C Clinic and availability of direct-acting antiviral (DAA) agents.

METHODS

Retrospective analysis of 469 HCV LTx, between Dec 1996 and July 25, 2015 (from 1,368 LTx).

- ❖ Era 1 ('97-2001)
- ❖ Era 2 (2002-06)
- ❖ Era 3 (2007-10)
- ❖ Era 4 (2011-15)

All DAA treatments in this study were post LTx. Kaplan Meier methodology, Log Rank and Chi square were utilized.

Table 1. Evolution of HCV Treatments and DAA's

| Drug | Approval |
|---|-----------|
| Interferon | 1991 |
| Pegylated Interferon | 2001 |
| Telaprevir / Boceprevir | 2011 |
| Sofosbuvir / Simeprevir | 2013 |
| Daclatasvir, Elbasvir, Ledipasvir, Ombitasvir, Velpatasvir, Dasabuvir | 2014-2016 |

- ❖ The lower 8% mortality in Era 3 prior to 2011 allowed patients the access to highly curative DAA therapies.
- ❖ Era 4 more than doubled the number of patients treated with DAA's over Era 3. Era's 3 and 4 more than tripled the number of patients treated.
- ❖ Over 90% of the patients in Eras 3 and 4 were alive and available for treatment.
- ❖ DAA's had a significant impact on HCV patients in our program while patients in Era 1 and 2 succumbed from hepatitis C complications.
- ❖ From 2007 forward, progress in HCV outcomes was noted, contributed by DAA and HCV cures. Those transplanted more than 10 years ago were highly excluded from the DAA era. Our three year results suggest that HCV patients now outperform most other populations of transplant patients.

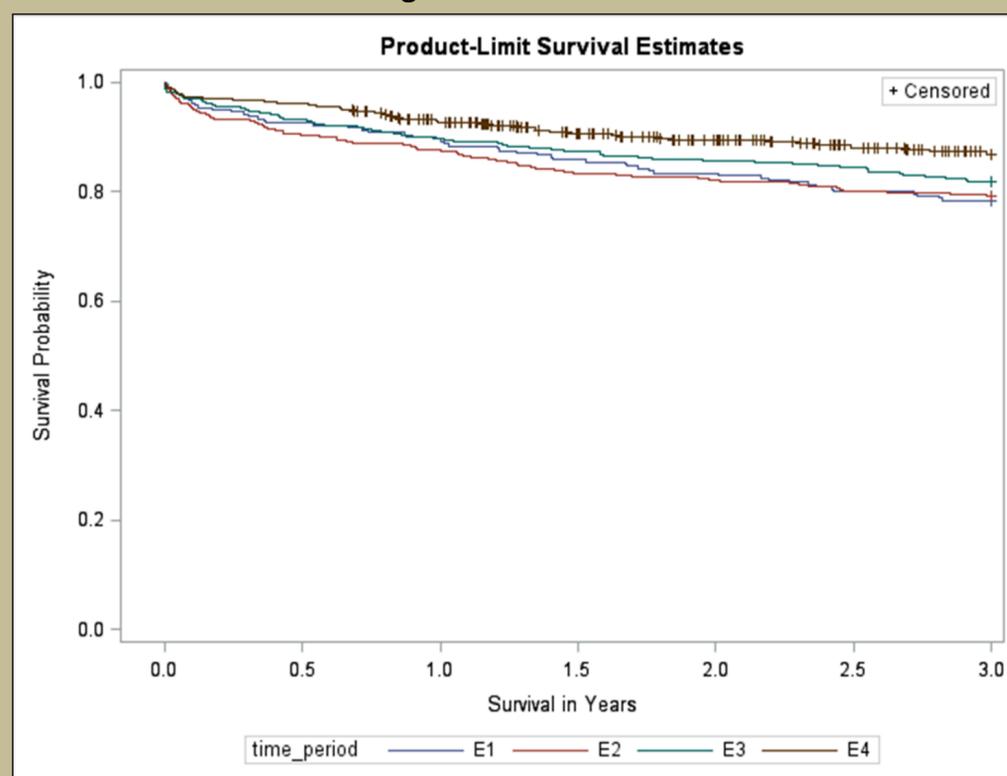
RESULTS

Table 2. Hepatitis C Era Summary of DAA Treatments

| Era | Era 1 | Era 2 | Era 3 | Era 4 |
|-----------------------|----------------|---------------|-----------------|----------------|
| N= | 115 | 133 | 110 | 111 |
| Died before 2011 | 61 | 53 | 9 | -- |
| Alive after 2011 | 54 | 80 | 101 | -- |
| Percent alive at DAA | 54/115 (46.9%) | 80/133 (60%) | 101/110 (91.8%) | -- |
| Percent dead at DAA | 61/115 (53.1%) | 53/133 (40%) | 9/110 (8.2%) | -- |
| Treated DAA | 10 | 11 | 24 | 46 |
| Cured DAA | 6 | 11 | 21 | 42 |
| Alive at DAA, treated | 10/54 (18.5%) | 11/80 (13.7%) | 24/101 (23.7%) | -- |
| Percent treated (/ N) | 10/115 (8.6%) | 11/133 (8.3%) | 24/110 (21.8%) | 46/111 (41.4%) |

- 91 patients were treated with DAA's, 80 were cured (88%). Table 2 depicts treatment rates.
- More patients were alive and available to be treated with DAA's in Era 3 (92%), less in Era 2 (60%), and much less in Era 1 (47%), **p=0.00001**. No differences between Era 1 and 2 were noted (p=0.37).
- Fraction of those treated with DAA's (alive at 2011) was not significant between the 3 eras (p=0.23).
- Fraction of those treated with DAA's from total in each era increased progressively from Era 1 to 4 (8.6%, 8.3%, 21.8%, and 41.4%, **p=0.00001**)
- More were treated with DAA's in Era 4 vs, Era 3 (**p=0.001**).

Figure 1. Survival



- The 1-year survival was 89% for all eras. At 3 years, HCV patients in eras 3 and 4 demonstrated superior survival (Era 3, 83.2% and Era 4, 86%), compared to Eras 1 and 2 (70.6% and 77.8%, **p=0.037**).
- The 5-year survival of Eras 1 to 4 was 61%, 68.7%, 80%, and 81.9%, **p=0.0036**. There was less death decay in Eras 3 and 4, only 2.2%/yr and 1.4%/year, respectively. Era 4 had 114 patients, with 3-year survival of 86%, vs. 77.3% prior to 2010, a 9% improvement.

CONCLUSION

REFERENCES

1. Kwo PY. Direct-acting antiviral therapy after liver transplantation. Curr Opin Gastroenterol 2016;32:152-8
2. Ponziani FR, et al. Future of liver disease in the era of DAA for the treatment of Hep C. J Hepatol 2017;9:352-67