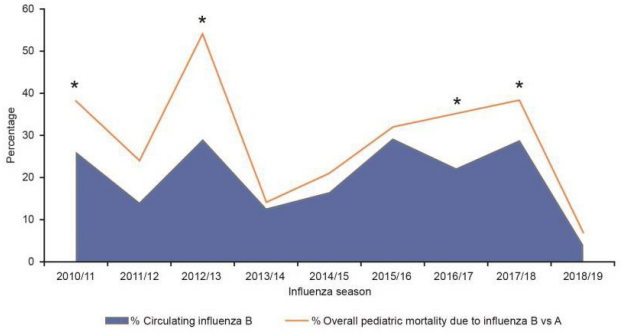
***Results.*** During the 2010/11 to 2018/19 seasons, influenza B accounted for 4.0%–29.2% of all circulating influenza strains. A/H3N2 viruses were the predominant circulating strain in most seasons. In the same period, influenza B accounted for 7.0%–54.1% of pediatric influenza-associated mortality (Figure). The proportion of influenza B-related deaths was significantly higher ($p< 0.01$) than what would have been expected based on the proportion of circulating influenza B strains in the general population, overall and in the 2010/11, 2012/13, 2016/17, and 2017/18 seasons. Point estimates of VE against influenza B for children aged 2–17 years ranged from 33%–70% for IIV between 2010/11 and 2017/18, and from 53%–82% for LAIV between 2010/11 and 2015/16.

Proportion of circulating influenza B strains compared with influenza B-associated pediatric mortality in the US between the 2010/11 and 2018/19 seasons




*$p<0.001$ for the difference between the contribution of influenza B to mortality versus its overall circulation. Criterion for statistical significance is $p<0.05$

US, United States

***Conclusion.*** During the study period, influenza B accounted for a disproportionate percentage of pediatric mortality in the US relative to its overall circulation. These data counter the perception that influenza B is less severe than influenza A in children and highlight the importance of influenza vaccination to prevent influenza and its complications.

***Disclosures.*** Allyn Bandell, PharmD, AstraZeneca (Employee, Shareholder) Pedro Piedra, MD, Roche (Consultant)Shionogi (Grant/Research Support) Christopher S. Ambrose, MD, MBA, AstraZeneca (Employee, Shareholder) Ravi Jhaveri, MD, AbbVie (Grant/Research Support)Alios (Research Grant or Support)Gilead (Grant/Research Support)Medimmune/AstraZeneca (Employee)Merck (Grant/Research Support)Saol Therapeutics (Consultant)Seqirus (Consultant)

**1396. Live Virus Vaccination Following Pediatric Liver Transplantation: Results from Two Academic Children's Hospitals**

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**Session:** P-63. Pediatric Vaccines

***Background.*** Guidelines for immunization following solid organ transplantation discourage live virus vaccination (LVV) in most recipients. Single-center studies support LVV as safe and effective in orthotopic liver transplant (OLT) recipients on steroid-free immunosuppression (IS). We retrospectively evaluated LVV after OLT at 2 pediatric hospitals.

***Methods.*** Records from OLT recipients between Jan 2007 and Dec 2017 at Lurie Children's (Chicago) and Children's Hospital of Philadelphia were reviewed. Patients who underwent OLT at either institution, had ≥ 2 years of follow up, and had documentation of vaccination prior to OLT were included. Adverse events (AEs) within two weeks of receipt of LVV were captured. Factors that might influence the selection of patients for LVV were reviewed, including choice, dose, frequency, and levels of IS medications. IS in non-vaccinated patients was compared to vaccinated patients at two year post-transplant follow-up in both groups using Chi-Square and T-test.

***Results.*** Data from 249 patients met inclusion criteria. Varicella zoster (VZV) vaccine was given at least once to 92 patients post-transplant, and MMR to 91 (Table 1). Compared to patients who were re-vaccinated after transplant, those who received their first LVV after OLT were transplanted at a younger age (0.8 v 2.2 years) and received LVV sooner post-OLT (649 v 907 days). AEs were rare for either LVV: 2 experienced injection site reaction, 2 localized rash, and 1 had fever. One recipient experienced worsening rejection one month after MMR and received IV steroids and increased IS, but had no clinical findings concerning for viral infection from vaccination. Most LVV recipients were on a single IS agent both at time of LVV and 2 year post-OLT (Table 2), with tacrolimus the most frequent agent. Compared to those that did not received LVV post-OLT, those that did were on one IS agent more often. Tacrolimus levels were similar among patients receiving LVV post-OLT compared with those who did not.

Table 1

| Table 1: Characteristics of OLT recipients receiving live virus vaccines (LVV) after transplantation | |
|---|---|
| Patients undergoing transplantation, N | 249 |
| Patients with ≥1 liver transplant, N (%) | 15 (6%) |
| Patients receiving ≥1 LVV | 96 (38.5%) |
| VZV, N (%) | 92 (36.9) |
| MMR, N (%) | 91 (36.5) |
| Patients with 1st LVV given after OLT | |
| Age at OLT, years (median) | 0.77[a] |
| VZV, N (%) | 54 (21.7) |
| MMR, N (%) | 58 (23.2) |
| Time of 1st LVV after OLT, days (median) | 649[b] |
| Patients re-vaccinated with LVV after OLT | |
| Age at OLT, years (mean) | 2.24 |
| VZV, N (%) | 38 (15.3) |
| MMR, N (%) | 32 (12.9) |
| Time of 1st LVV after OLT, days (median) | 907 |
| Adverse events | |
| Patients with 1st LVV given after OLT | |
| VZV vaccine, N of AEs (% of vaccinated pts) | 2 (3.7) |
| Injection site reaction | 1 |
| Localized rash | 1 |
| MMR vaccine, N of AEs (% of vaccinated pts) | 2 (3.4) |
| Injection site reaction | 1 |
| Rejection episode | 1 |
| Patients with history of ≥1 LVV prior to OLT | |
| VZV vaccine, N of AEs (% of vaccinated pts) | 1 (2.6) |
| Fever post-vaccination | 1 |
| MMR vaccine, N of AEs (% of vaccinated pts) | 1 (3.1) |
| Fever post-vaccination | 1 |

Table 2

| Table 2: Immunosuppressive regimens in patients administered and not administered LVV | | |
|---|---|---|
| Number of immunosuppressive medications at time of LVV | 1 | >1 |
| Patients with 1st LVV given after OLT | | |
| VZV vaccine, N (%)[c] | 43 (81.1) | 10 (18.9) |
| MMR vaccine, N (%)[c] | 46 (80.7) | 11 (19.3) |
| Patients re-vaccinated after OLT | | |
| VZV vaccine, N (%) | 33 (86.8) | 5 (13.2) |
| MMR vaccine, N (%) | 29 (90.6) | 3 (9.4) |
| Number of immunosuppressive medications 2 years after OLT | 1 | >1 |
| Patients with 1st LVV given after OLT[d] | | |
| VZV vaccine, N (%) | 41 (77.4) | 12 (22.6) |
| MMR vaccine, N (%) | 44 (77.2) | 13 (22.8) |
| Patients re-vaccinated after OLT[d] | | |
| VZV vaccine, N (%) | 29 (76.3) | 9 (23.7) |
| MMR vaccine, N (%) | 25 (78.1) | 7 (21.9) |
| Patients who did not receive LVV after OLT[d,e] | 89 (62.7) | 53 (37.3) |
| Tacrolimus levels (ng/dL) 2 years after OLT, Mean (SD) | | |
| Patients with 1st LVV given after OLT | 4.84 (1.75)[f] | |
| VZV vaccine | 4.91 (1.74) | |
| MMR vaccine | 4.84 (1.75) | |
| Patients re-vaccinated after OLT | 6.34 (3.07) | |
| VZV vaccine | 6.34 (3.07) | |
| MMR vaccine | 6.20 (2.90) | |
| Patients who did not receive LVV after OLT[e] | 5.66 (2.31) | |

a. Median for age at OLT for 1st LVV vs re-vaccinated was significantly different (p=0.000)
b. Median for days post OLT for 1st LVV vs re-vaccinated was significantly different (p=0.007)
c. One patient did not have any IS agents documented at the time of LVV vaccination
d. Those who received LVV post-OLT were significantly more often on one IS agent at 2 year post-OLT follow-up compared to those who did not receive LVV ( p=0.025)
e. There was no significant difference (p=0.317) for tacrolimus levels at 2 year follow up for those receiving LVV after OLT compared to those that did not receive LVV after OLT

***Conclusion:*** In a series of pediatric OLT recipients, post-OLT LVV was generally safe and well tolerated. Patients who received LVV post-OLT were more often on one IS agent at 2 year follow up compared to those who did not. Our study supports prospective efforts to define guidelines for patients who may safely receive LVV after OLT.

***Disclosures.*** Kevin J. Downes, MD, Merck, Inc. (Grant/Research Support)