EVALUATION OF THE CLINICAL PHARMACIST IMPACT ON TOTAL PARENTERAL NUTRITION PRESCRIPTION ORDER REVIEW AND PREPARATION IN NEONATAL INTENSIVE CARE UNIT

H. NAJEM
KESEGUEN MEDICAL CENTER AFFILIATED WITH AUBMC - PHARMACY DEPARTMENT - BEIRUT - LEBANON

BACKGROUND
Clinical Pharmacist (CP) services to hospitalized patients are highly recommended especially in vulnerable populations such as neonates. Latter are in need for prompt nutrition support but total parenteral nutrition (TPN) practices remain unsatisfactory due to lack of knowledge of neonatal nutritional needs. CP plays a crucial role in all steps of TPN: prescribing review, compounding and administering instructions. However, there is insufficient evidence related to the role of CP in Neonatal Intensive Care Unit (NICU) setting, and most of the literature is either outdated or focuses on lack of standardization of practices, and the role of CP as prescriber in NICU. Few (and none in our country) have focused on the role of CP in all TPN related processes and the impact on decreasing the potential errors and fatal events.

PURPOSE
To evaluate the impact of involving CP in TPN order review and preparation in NICU on the potential errors related to 2:1 intralipid (Dextrose/Aminoacids) and Lipid prescription orders.

MATERIALS AND METHODS
A 6-month prospective analysis was conducted in NICU where TPN order set forms, that were elaborated by CP were filled by neonatologists and sent on a daily basis to CP for review calculations, issuing of labels and instructions for compounding and administration. Any noted error or discrepancy in the order was communicated to the neonatologist for prompt amendment.

RESULTS
209 in 2:1 and 149 Lipid prescription orders were analyzed. 57.5% of 2:1 and 11.5% of Lipid prescriptions contained errors in dosing, infusion rate and volume, missing components, wrong venous access, and high risk of precipitation.
Most common 2:1 order errors prevented by CP involved: Amino acids dose (14.6%), followed by Total infusion volume (13.2%), Rate of Infusion (13.2%), Hepatins dose (13.2%), Missing component (12.5%), Precipitation of Calcium and Phosphorus risk (12.1%), Dextrose dose (9.2%), Venous access not mentioned (8.4%), Venous access (central vs peripheral) (1.8%), Trace elements dose (1.1%), Electrolytes dose (0.7%).
Most common Lipid order errors prevented by CP involved: Rate of infusion (44.5%), followed by Total infusion volume (37%), Lipid dose (11.1%), Lipid soluble vitamin dose (3.7%), Missing component (3.7%).

LIPID ORDERS ERROR TYPES PREVENTED BY CLINICAL PHARMACIST
1. Missing Component
2. Wrong Lipid Soluble Vitamin Dose
3. Wrong Lipids Dose
4. Total Infusion Volume
5. Wrong Rate of Infusion
6. Wrong Trace Element Dose
7. Wrong Venous Access
8. Venous Access Not Mentioned
9. Precipitation Risk (Ca/P)
10. Missing Component
11. Wrong Dextrose Dose
12. Wrong Electrolytes Dose
13. Wrong Trace Element Dose
14. Wrong Venous Access (Central vs Peripheral)
15. Venous Access Not Mentioned
16. Precipitation Risk (Ca/P)
17. Missing Component
18. Wrong Rate of Infusion
19. Wrong Hepatins Dose
20. Wrong Total Volume
21. Wrong Trace Element Dose
22. Wrong Venous Access
23. Venous Access Not Mentioned
24. Precipitation Risk (Ca/P)
25. Missing Component
26. Wrong Dextrose Dose
27. Wrong Electrolytes Dose
28. Wrong Trace Element Dose
29. Wrong Venous Access (Central vs Peripheral)
30. Venous Access Not Mentioned
31. Precipitation Risk (Ca/P)
32. Missing Component
33. Wrong Rate of Infusion
34. Wrong Hepatins Dose
35. Wrong Total Volume
36. Wrong Trace Element Dose
37. Wrong Venous Access
38. Venous Access Not Mentioned
39. Precipitation Risk (Ca/P)
40. Missing Component
41. Wrong Dextrose Dose
42. Wrong Electrolytes Dose
43. Wrong Trace Element Dose
44. Wrong Venous Access (Central vs Peripheral)
45. Venous Access Not Mentioned
46. Precipitation Risk (Ca/P)
47. Missing Component
48. Wrong Rate of Infusion
49. Wrong Hepatins Dose
50. Wrong Total Volume

DISCUSSION
Errors of ordering resided more in 2:1 rather than Lipid prescriptions, to note that some order contained sometimes more than one error.

Upon review of orders and before issuing of labels and preparation, CP could detect and prevent errors belonging to different categories (doses, missing items, venous access, rate/ volume of infusion, etc.). Some these errors could have led to fatal events if not prevented by CP such as Calcium/ Phosphorus precipitation and wrong venous access (i.e., high mortality preparation administered through peripheral rather than central line).

CONCLUSION
This study shows the impact of including CP in TPN processes by highlighting all the potential errors of prescription/ preparation and fatal events that he/ she prevents thus achieving optimal neonatal nutritional needs and contributing to patient safety. Further studies could be conducted to assess the financial impact of CP driven TPN error prevention as well as other roles of CP in NICU setting which remains a neglected area.