

## The Use of 0.2 Micron Filter for All Intravenous Fluids in Sheikh Khalifa Medical City Paediatric Intensive Care Unit Practice Change Project

Bha'a Aldeen Mohammad Fwwaz Khanfar\*, Jolly George, Rosy Devassy, Manju Sebastian, Jeena Mathew, Princy Mathew, Saranya Chandran, Marianne Acacio, Litty Thomas, Lijo Thomas and Venda Pandurangan

RN, PICU Clinical Nurse Coordinator, Sheikh Khalifa Medical Center, Abu Dhabi, UAE

### \*Corresponding author

Bha'a Aldeen Mohammad Fwwaz Khanfar, RN, PICU Clinical Nurse Coordinator, Sheikh Khalifa Medical Center, Abu Dhabi, UAE, E-mail: bhaa\_khanfar104@yahoo.com

Submitted: 13 Sep 2019; Accepted: 04 Oct 2019; Published: 10 Oct 2019

### Abstract

The Aim of this paper is to determine if the use of inline filter (0.2 Micron filter) is an evidence based practice, wither it has any positive impact on Decreasing CLABSI (Central Line Associated Blood-Stream Infection), Removing Large Particles or Air from line thus at the end prevent phlebitis and air embolism. This paper is benchmarking similar institutions practice, reviewing hospital's policy requirements in this matter; reviewing literatures related to this practice and providing a clue about the annual coast of the use of this filter in Sheikh Khalifa Medical City –Abu Dhabi PICU.

**Keywords:** 0.2 Micron Filter, Inline Filters, CLABSI, Phlebitis, PICU, Coast Effectiveness

### Introduction

According to SKMC policy, pharmacy is using 5-micron filter needle or straw for all recommended medications during preparation. Thus per the same policy the usage of 0.2 Micron filter is not needed for any IV fluid in any specific unit or group of patients except for a list of few medications. Moreover A study conducted by American journal of Health system pharmacy (AJHP) to revise the inline filtration policy from the centers for disease control and prevention (CDC) observed that routine filtration of intravenous medications for infection control purpose doesn't add any benefit. This practice was not supported by any well-designed experimental or epidemiological research. On the basis of this review, the CDC guideline committee voted to discontinue the routine use of inline filters. Committee recommended a list of medications need filtration before administration be created to assist nurses and pharmacist in making the transition away from routine use of inline filters for all intravenous preparations.

For the mentioned points, a group of SKMC-PICU nurses decided to search the scientific justification of inline filter usage to know if it is evidence based so the experience of SKMC-PICU will be shared and generalized with other units and SEHA hospitals, or it is not thus a change for this practice will be recommended.

The purposes of this project are:

- Determine the indications and effectiveness of the use of 0.2 Micron filters

- Set Criteria and guideline with the use of .02 micron in clinical setting
- Review the impact on unit budget

### Method and Materials

- SKMC IV medications administration policy was reviewed, practice benchmark with other SEHA facilities, literature review, and Unit budget review in regards to usage of 0.2 micron filter cost for the previous 3 years.



### Literature review

Upon literature review one study done by DestinyChau MD in 2016 States that Inline Iv filters observed to back-siphon when lowered below patients heart level, This effect is usually readily visible as blood can be seen travelling up the tubing towards the filter. In pediatric cardiac patients receiving vasoactive infusions with an inline IV filter in place, inadvertent change of the patients position relative to the filter level can cause major changes in infusion rates and lead to clinically significant hemodynamic effects. These hemodynamic changes could be attributed to other causes and lead to erroneous management actions.

Another study by Tanaka H Did a study based on the effectiveness of intravenous inline filters for mechanical removal of large particles, precipitates, bacteria, fungi, large lipid globules and air and wither using filter will decrease CLABSI. The result was CLABSI rate, catheter utilization rate and mortality did not differ significantly

between the two periods.

One more study conducted in US National library of medicine, National institute of health AMJ to study the binding of selected drugs (digoxin, Insulin) to a treated inline filter approximately 8 to 12% of the initial amounts of digoxin and insulin were bound to the filter.

CDC guidelines for the prevention of intravascular catheter related infections states that No data support the efficacy in preventing infections associated with intravascular catheters and infusion system In line filters /0.2 micron filters, reducing the risk for phlebitis in patients who require high dose of medication, removing particulate matter that might contaminate iv fluids, filtering endotoxin produced by gram negative organism in contaminated infusates. These theoretical advantages should be tempered by the knowledge that infusates related BSI is rare and that filtration of medications or infusates in the pharmacy is a more practical and less costly way to remove the majority of particulates. Furthermore inline filters might get blocked, especially with certain solutions, thereby increasing the number of line manipulations and decreasing the availability of administered drug, Thus for reducing the risk for CLABSI.

One study about the effectiveness of Intravenous in-line filters for preventing morbidity and mortality in neonates Jann P Foster showed that the use of in-line filters compared with unfiltered fluids for intravenous infusion had no statistically significant difference in effectiveness on overall mortality, proven and suspect septicemia, or other secondary outcomes (including local phlebitis and thrombus, necrotizing enterocolitis, duration of cannula patency, length of stay in hospital, number of catheters inserted and financial costs) in neonate patients.

## Discussion

The aim of using the 0.2 micron filter is to prevent any unwanted particles to reach the blood stream. Those particles could be air, bacterial toxins, glass... etc, though as per literatures the routine use of this filter for all IV fluids was not proven to reduce risk for Central Line Associated Infection (CLABSI), Septicemia, or mortality in pediatric or neonate patients, Moreover the coast of this practice is considered very high compared to unproved poor outcome.

The annual Cost of using 0.2 micron filter in PICU-SKMC

Year	2016	2017	2018	1 <sup>st</sup> Q 2019
Consumption in Pcs	21950	21060	21230	5400
Coast in AED	395100	379080	382140	97200

## Conclusions

After refereeing to SKMC policies, benchmarking the practice of similar entities in SEHA, reviewing CDC guideline along with many other up to date evidences, and studying the coast of using the 0.2 micron filter and the impact on unit budget, the recommendations of this paper is to change the practice from using the mentioned filter for all IV fluids to limit the usage for TPN only and as per SKMC policy.

Duration of Project Trail 2 months in PICU, with continuous feedback from the end users and other health care providers [1-6].

## References

1. Centers for disease Control and prevention, Guideline for prevention of intravascular Device related infections. [www.cdc.gov/ncidod/hip/iv/.htm](http://www.cdc.gov/ncidod/hip/iv/.htm).
2. National co-coordinating committee on large volume parenterals AJM hosp pharmacy.
3. James M Hughes, MD, Director, Division of healthcare quality promotion, Steven L Solomon MD Acting Director. CDC guidelines for the prevention of intravascular catheter related infections –publication by national centre for infectious disease.
4. Kevin Curler, pharm D, MBA, BCPS, Lisa A. Thompson Pharm D, BCOP. [www.apsf.org/apsf-news-letter](http://www.apsf.org/apsf-news-letter).
5. Tanaka H, Ambiru S, Kawaguchi T, Sugita Y, Kawajiri C, et al. (2016) Cessation of In-line Filters in Central Venous Catheters Does Not Significantly Influence the Incidence of Bloodstream Infections and Mortality in a Hospital Hematological Ward. Intern Med. 55: 1287-1292.
6. [www.researchgate.net/publication/46637947](http://www.researchgate.net/publication/46637947).

**Copyright:** ©2019 Bhaà Aldeen Mohammad Fwwaz Khanfar. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.