

Standard procedures: blood culture sampling for emergency room nurses research pr...

[Environment](#), [Pollution](#)



Abstract

Collecting blood culture samples is an important part of data collection for the process of diagnosis. The results of such a test can provide information regarding the presence of bacteria within the patient's blood with great certainty. Therefore, it is integral to the verification of a prognosis.

Unfortunately, there are a variety of factors that can lead to false positives on these tests. One way this can occur is through improper collection practices. This is seen amongst emergency room nurses to varying degrees. Because of the great risk associated with diagnoses and future medical treatments based on incorrect test results, it is integral to avoid contamination. One way that contamination can be prevented is by following an established set of rule. Through several pre-existing systems of sample collection including a non-touch pack, it is possible to identify the best and most useful strategies for proper collection. Implementing such techniques provides the nurse or practitioner the highest likelihood of procuring a sample that is of the best caliber and of use to the physician. The best practices would also enable emergency room nurses, who may have to perform the same duties in a shorter period of time, the most useful strategies to procure uncontaminated samples.

Introduction

Background and Significance of the Problem.

Blood contamination is a significant problem amongst nurses collecting samples in the emergency room. Since blood culture verification is one of the most necessary and trusted diagnostic tools, it is integral to the patients'

health that this process takes place without error or risk. Because of relatively short period of time available for this procedure, it is imperative that nurses follow a clearly delineated approach in order to prevent contamination.

There has been a great deal of research conducted in this area in order to promote the proper cultivation of such techniques. Based on the location of the nurses and the particular hospital, there have been a variety of methods offered to address this issue. Still, it is important for healthcare organizations to mandate a standardize approach to this process in order to keep contamination low and decrease the amount of false positives that occur.

Statement of the Problem

The problem addressed in this discussion and research, is what standards should be encouraged amongst nurses in order to facilitate the best results in blood collection that allow for decreased rates of contamination.

Statement of the Purpose

In this project the intended goal is to review the best practices in blood collection, and identify useful strategies to decrease contamination. These techniques will then be analyzed in terms of their potential benefit or use for nurses, and will contribute to a standard for best practices in emergency room blood sample collection. While the general principles behind collection are the same, there are a variety of nuances to the technique that can provide potential benefits for the healthcare facility on a whole. For example, if the correct cleaning and hygiene techniques were implemented, the

chance of bacterial contamination would decline. Other simple techniques may be able to benefit the collection process overall.

Review of the Literature

Blood cultures are required for physicians to make the most accurate diagnostics for patients. They enable doctors to identify whether or not certain bacteria are present in the blood. Drawing blood is also a standard procedure whenever a patient may have a fever (Covenant, 2011).

Bacteria are a great cause for morbidity in patients and must be accounted for in the blood culture process. Since blood tests are considered to be one of the most effective and resolute ways of determining whether a particular element is present, they are the 'gold standard' when it comes to diagnosis (Proehl, 2012).

Anytime there is suspicion of the patient having an infection, blood culture sampling is necessary to help the physician decide the particular course of action. When there is contamination present, false positives may occur. This is dangerous to the patient's health because such a test result could yield varied physician decision making. The selection of certain procedures over others, based on this information, could result in harm to the patient. This makes the process of following the correct techniques all the more effective (Rowley, 2011).

The process of acquiring a blood culture is lengthy, and any error may result in improper test material. This can yield either erroneous results, or inconclusive tests. In order to correctly obtain a blood culture sample, it is imperative to follow rigid guidelines that outline the best practices

(Covenant, 2011).

Ultimately, following the steps outlined for blood culture sampling can result in the maximum amount of valuable samples that are usable for further testing. Some preliminary measures include obtaining the correct vials, examining materials and identifying the patient as well as gathering necessary equipment before washing hands. The patient must be seated or laying down before extending their arm. A tourniquet is tied around the patients arm before they make a fist. Next a venipuncture site is located, and the patient releases their hand. The area is cleaned and prepped, and the appropriate bottles are marked. Bottles are cleaned and the needle is placed in the vacutainer holder. After these steps are complete, the blood drawing order is identified. The tourniquet is retied and the butterfly plastic guards are removed. Next the vein is anchored and punctured when the site is located and the practitioner is ready. The patient releases once blood flow is procured, and the collection continues till the sample is received. The concluding steps of this process include applying pressure to the puncture site and cleaning the patients arm with an alcohol prep pad (Covenant, 2011).

The Aseptic Non Touch Technique (ANTT) is one highly verifiable method of achieving useful blood culture samples. The formation of this procedure is considered greatly beneficial on a global scale. Guidelines for this technique include nationally peer-reviewed guidance for the safe and effective labeling of laboratory culture. This system has been recognized for its benefits and advantages in achieving better results that are frequently less contaminated (Rowley, 2011).

The main superiority of using the Aseptic Non Touch Technique is that it prevents microbial infection of the samples as they are being collected. This is beneficial and applicable in both clinical and nonclinical environments of blood culture collection. Some key areas that are significant and unique to this technique, are educating the administrators to be aware of the key parts and methods of processing (Mitchell, 2011).

A key part is identified as a sterile part of the equipment. For example, the syringe hub must remain sterile throughout the procedure for effective collection. A key site is a wounded area or otherwise special location on the patient that requires particular care or attention to so that no microorganisms may enter due to vulnerability (Mitchell, 2011).

Steps that outline the procedures of ANNT are rigorous and demand the highest precision in technique in order to provide adequate samples. The practitioner must first wash their hands, clean the surrounding area, identify the correct area for the procedure. The procedure pack is identified and opened before being placed in a sterile environment and the patient is prepared. Then, they prepare for the collection by cleaning hands and changing gloves followed by ensuring the collection equipment are sterile (Mitchell, 2011).

There are many different strategies used by hospitals and health care facilities in order to generate the highest quality results in blood collection sampling.

One study illustrates a rate of blood contamination reaching 5.2% before intervention. This study identified the use of adult blood culture collection packs in diminishing the level of contamination. Using 2% chlorohexadine

and 70% alcohol, the collection packs were integrated throughout the hospital. Detailed step-by-step instructions were included with photo demonstrations to illustrate the process of using this technique, while junior doctors were given hands on training. The result over six months, was a reduction of contamination rates from 5.2% to 4.6%. Further, the rate of samples collected was increased to 50.4 blood culture bottles per occupied bed in the hospital (Bonnici, 2011).

The goal of most health organizations is to keep the blood culture contamination rate below 3%. Still, there is a huge deal of variance that indicates measures to create better practices are not universally accepted nor provide standardized results. Aside from misdiagnosis, improper techniques in blood culture sample collection can increase the length of patient stay in hospital facilities, or increase the general cost of healthcare services. It creates delay for the patients and makes the job of verifying diagnosis more time consuming (Proehl, 2012).

Review of the Theoretical Literature

Prevention of blood culture contamination is addressed through a review of Clinical Practice Guidelines. This investigation found that the reduction of contamination is distributed amongst three phases. Quality blood culture results in pre-analytic, analytical and post-analytical time points. These correlate to the specimen handling, and patient variables in addition to the collection process (Proehl, 2012).

One area that is of particular relevance is the patient's skin and how it is treated prior to puncture. Studies have found that inadequate preparation is

a common cause for blood contamination. Bacteria from the skin can be driven into the sample and identified later, though it is not within the blood stream. By using cleaning materials with alcohol, research shows this risk can be mitigated. This is beneficial because alcohol has a quick drying time (Proehl, 2012).

Other techniques that help reduce contamination include routine sterilization of gloves can provide even higher consistency in blood culture sample results. By cleaning the bottle top, sterility can help decrease the risk of contamination as well. Collection packs have been demonstrated to decrease the incidence of contaminated blood samples significantly.

Review of Relevant Research

According to the relevant research, there are a number of techniques which can benefit clinician protocols in receiving and developing samples. Perhaps the most beneficial technique was the use of readily made packs. This had a significant reduction on the amount of contamination experienced, gathering more samples that were useful. The decline of contamination by more than 5% indicates that this is the most useful strategy in technique for creating the best results (Proehl, 2012).

Summary

Overall there are a variety of useful techniques that can prevent contamination from a staff perspective. Using a Non-touch pack is one way to significantly reduce such risks. Another element of proper technique would be to ensure the area is cleaned with the correct tools and protocols. By sterilizing the environment correctly as well as all gear involved with the

collection, the likelihood of contamination decreases significantly. These are some of the most relevant findings from the literature review that indicate a centralized theme of contamination reduction directly resulting from standardized practices.

Methods

The most significant strategies that would benefit standardized procedure are proper education and training. When the practitioners are aware of the best ways to collect samples, they will be able to deter contamination and increase the scope of useful samples. Another prominent finding from the relevant research, is that there can be effective samples procured in greater quantities when the environment and equipment are properly sterilized. This is key to identifying the proper elements are clean as well as accounting for new situations.

Procedures/Process

The process of evaluation for this topic begins with a literature review. Identifying key strategies that have been implemented successfully to reduce contamination is the beginning point for establishing effective technique. After reviewing several prominent ways, the efficacy will be gauged of techniques that are significant in dealing with contamination. Through defining the aspects that could potentially become standardized procedure for nurses, the elements of time and sensitivity to patients will be addressed. A literature review of pub med. gov and other peer-reviewed studies will transpire. Key terms used in the search included blood culture sampling procedures, standard blood culture packs, and reducing

contamination in blood sampling. Results of research published within the past ten years were included in the findings.

Techniques that were identified in more than one article were identified and defined further. Significant statistical or qualitative support of these strategies was used to identify the most prominent or positive yielding ones.

Findings

It was found in this research, that using techniques to increase the quality of practices had a significant impact on the amount of contamination. The more quality assurance programs that were in place, the lower levels of contamination were present. The utilization of blood culture packs and appropriate education also lend to positive results and lower rates of contamination in general.

Just as there is a two step procedure for the non-touch pack to draw a sample, the importance of sterility and ensuring clean hygiene cannot be stressed enough. When practitioners are actually encouraged and shown how to complete these tasks in a hands on way, they are more likely to retain the strategies and techniques and implement them individually. Thus, education can result in enhanced and variegated benefits across the healthcare facility.

These two techniques are highly beneficial and can work together to prevent contamination from a practitioner standpoint. While they have been shown to drastically decrease these risks in a general population, there is little evidence of the effect an emergency room setting has on these protocols. It is possible that such an environment could elicit a different strategy from a

nurse who may be taken off guard or need the blood sample to be drawn immediately. The elements of time-sensitivity may alter some of the efficacy that is seen across the board in research till now.

Overall, a great deal has been identified in the area of practitioner driven contamination reduction. This can be augmented by further research that identifies the use of blood culture packs and education for nurses specifically assigned to the emergency room. Such a study would result in a beneficial understanding of the mitigated, enhanced, or highly comparable results for a high-pressure situation blood sampling versus a normal clinical one.

Conclusions and Recommendations

In conclusion, there are significant aspects of practice, research, and education that can resolve hospitals with high contamination rates related to blood culture sampling. Firstly, standardized procedures should include the use of a test-pack. This has been demonstrated to be effective in numerous accounts and decreases the incidence of contamination greatly. It can be simple to implement and training can be conducted unilaterally, allowing for the maximum results, even for high-pressure situations such as those that may occur in the ER.

Research must be conducted in order to identify the most efficient practices for nurse practitioners during the collection process when they may need to do so in a rush. This element of time sensitivity has not been addressed and could benefit from further investigations or more careful analysis.

Proper education should be required for nurses with regards to hygiene and cleansing the area designated to be a puncture site. It does seem that the

best techniques involve alcohol as a cleanser for the surface area during preparation.

Limitations

There are several limitations to this assessment of techniques involved with best practices in blood culture contamination prevention. While the literature review detailed several unique procedures as well as the non-touch pack, the practitioners of these studies were not differentiated. Since some practitioners, mainly doctors, received hands on training while the nurses did not, there may have been differences in application or pack usage. This creates a rift that is not explored in the study. Further, since nurses would be involved with the specific environment of emergency rooms, findings may not be relevant when detailing how to prepare a patient for sampling in a non-medical environment.

Overall the techniques identified through historical or scientific discoveries previous to this study, are general and conducive to reduction of contamination in practice. This information can help, if implemented speedily, in an emergency room setting. However, without adequate training and the proper usage of each strategy, it can be difficult to gauge the difference in contamination levels between test groups.

Reference List

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