OBJECTIVE

This study was approved by the Michigan State University IRB: IRB#: 11-808SI

Very small quantities of blood can be visually detected in the saline irrigation used during arthroscopic surgery and thus obscure visualization within the joint. A systematic documentation of the visual appearance of blood in arthroscopic fluid was not previously performed. The clinical advantage of possessing a library of photographs documenting exact volumes of blood in known saline irrigation volumes was not appreciated. To simulate bloody irrigation from arthroscopic surgery, known quantities of anti-coagulated blood were added to saline arthroscopic irrigation fluid, and then photographed on white graph paper. The bloody arthroscopic irrigation specimen photographs were arranged sequentially to create an Arthroscopic Irrigation Blood Loss Reference Chart (AIBLRC). An unknown bloody arthroscopic irrigation specimen can now be visually matched to the AIBLRC to determine blood loss per volume of saline irrigation used.

INTRODUCTION

Arthroscopic irrigation contains blood after distending the joint and keeping the surgical field sufficiently clear to perform the operative procedure. Very small quantities of blood within the joint space can cause opacification of the irrigation fluid and render effective surgery impossible to complete. Following arthroscopic surgery, blood tinted irrigation may leak from arthroscopic port sites and cause fear and anxiety in patients and health care providers. Accurately estimating the volume of blood mixed with saline arthroscopic irrigation in total volumes of either 50 or 100 ml and photographed. Specimen volumes were selected based on the average volume of irrigation needed to distend the knee joint during arthroscopic surgery. All of the simulated bloody arthroscopic irrigation specimen photographs and the Arthroscopic Irrigation Blood Loss Reference Chart (AIBLRC) were uploaded to YouTube and Google Images.

METHODS AND MATERIALS

A photographic library of simulated bloody irrigation specimens was created and arranged to produce an Arthroscopic Irrigation Blood Loss Reference Chart (AIBLRC). Sixteen milliliters of anti-coagulated blood was added to eighty-four milliliters of saline arthroscopic irrigation. The simulated bloody irrigation specimen was photographed in a clear urine laboratory cup from the top and side on white graph paper with blue lines. Serial dilutions were performed to create specimens containing a known quantity of blood mixed with saline arthroscopic irrigation in total volumes of either 50 or 100 ml and photographed. Specimen volumes were selected based on the average volume of irrigation needed to distend the knee joint during arthroscopic surgery. All of the simulated bloody arthroscopic irrigation specimen photographs and the Arthroscopic Irrigation Blood Loss Reference Chart (AIBLRC) were uploaded to YouTube and Google Images.

A VISUAL ESTIMATION OF BLOOD LOSS IN ARTHROSCOPIC IRRIGATION

How to calculate blood loss in arthroscopic irrigation:

Example:

Step 1: Verify the volume of the arthroscopic irrigation sample in the clear standard 120 ml urine specimen cup viewed on a background of white graph paper.

Step 2: Select the appropriate chart row based on specimen volume and match the unknown specimen to the column of added blood on the AIBLRC.

(Match for 100 ml specimen with 0.034 ml added blood)

Step 3: Total arthroscopic irrigation volume used DIVIDED by specimen cup volume MULTIPLIED by added blood volume EQUALS total whole blood loss in the arthroscopic irrigation

EXAMPLE CALCULATION

If total surgical irrigation 1000 ml; specimen volume 100 ml

1000 ml / 100 = 10 ; 10 X 0.034 ml = 0.34 ml blood loss per 1000 ml of arthroscopic irrigation

DISCUSSION

The online availability of the Michigan State University College of Osteopathic Medicine Arthroscopic Irrigation Blood Loss Reference Chart (MSUCOM, AIBLRC) enables orthopedic surgeons and anesthesiologists to quantify and document blood loss from arthroscopic surgery. Patients and health care professionals can use the AIBLRC to better appreciate blood loss seen draining from arthroscopic surgical port sites and on dressings. Even when patients don’t have online access to the AIBLRC, they can collect and photograph their drainage on dressings. Using a smartphone, the pictures can be sent to a caregiver for comment. The AIBLRC is both an educational and diagnostic tool with documentation capabilities.