

The Alberta College of Paramedics



Alberta Occupational Competency Profile (AOCP)
Updated "Gap" Training Program

Emergency Medical Technologist -
Paramedic (EMT-P)

Femoral Venipuncture Module

Study Guide

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Acknowledgements & General Information

INTRODUCTION

The overall goal of this program is to provide standardized upgrade “gap” education to ensure that all regulated practitioners of the Alberta College of Paramedics (College) meet the *Health Professions Act*, Paramedic Regulation and the scope of practice as defined by the Alberta Occupational Competency Profiles (AOCP) for the profession.

The Alberta Occupational Competency Profiles (AOCP) were developed through the facilitation of Dr. Bill DuPerron of Alberta Health and Wellness. Many College regulated practitioners were involved in compiling and organizing information about the roles and functions of paramedics, emergency medical technicians and emergency medical responders into the Profile.

The completion of the AOCP for the College is an important milestone for the profession. The document is a result of a collaborative partnership with the College and Alberta Health and Wellness plus the work and effort of members of the College.

The Competency Profile describes the vast expanse of competencies in Alberta at the present time as well as additional changes in scope of practice, which are identified in the Upgrade “Gap” Training Program. Each module in the “Gap” Training Program covers the additional competencies for a specific Competency Cluster as identified in the AOCP for each of the three disciplines regulated by the College. The Profile includes the knowledge, skills, attitudes, and judgments related to a variety of roles held by registered practitioners of the College.

BACKGROUND

The Health Professions Act (HPA) governs all regulated health professions in Alberta. The HPA was passed by the Alberta Legislature in May 1999 and in December 2001 the Order in Council proclaiming the Health Professions Act was signed by the Lieutenant Governor.

The HPA replaces a regulatory system (the *Health Disciplines Act*) that included multiple statutes that had different registration, continuing competence and investigation and disciplinary processes. Under the HPA, previous legislated exclusive scopes of practice will be eliminated and replaced with an “overlapping scope of practice” model based on restricted activities. Restricted activities are health services that only authorized persons may provide.

STRUCTURE OF THE HPA

The HPA will deal with processes such as registration, continuing competence, professional conduct, restricted activities, investigation and discipline that apply to all the professions. Each of the 28 professions will have their own regulation that will address in detail, profession specific areas such as required qualifications for entry into the profession. The Paramedic profession is expecting to be governed by the HPA in the near future.

ABOUT THE AOCP

Most of the competencies have been learned in basic education; other competencies have been acquired through advanced education, on the job training, and experience. All EMRs, EMTs and EMT-Ps have the basic competencies; however, competency on the job will vary depending on job requirements, and policy and procedure of the employing agency.

The Profile provides a cumulative view of the competencies within the Scope of Practice and within the general and specialized areas of that practice.

The College has developed the following educational module for upgrading the knowledge and skills of registered practitioners to meet the Alberta Occupational Competency Profiles (AOCP), the new Regulation and scope of practice.

HISTORY OF THE PROCESS

On March 4, 2000, the Paramedic Association of Canada adopted the National Occupational Competency Profile (NOCP), which included both a new classification and generic competencies for four professional designation levels of Paramedicine.

On March 22, 2000, the Alberta College of Paramedics' Council made the commitment that the Alberta College of Paramedics AOCP would meet or exceed the NOCP.

ACKNOWLEDGEMENTS

Alberta College of Paramedics
Continuing Competency Ad Hoc Education Committee Members:

Douglas Britton, MEM, EMT-P, Chair
Renee Linssen, EMR, Vice-Chair
William Coghill, MEM, EMT-P, CHCA
Ruth Farrow, EMT-P, MLT
Christine Patterson, MEM, EMT
Richard Poon, BSc., EMT-P, MEd
Marilyn Ringness, BSc., EMT-P
Barry Straub, EMT-P

Donna Lefurgey, CEO/Registrar
Laurie Mitchell, Registration Division Leader

Package Development and Design

Portage College Prehospital Care Programs
Lac La Biche, Alberta

In collaboration with...
Alberta College of Paramedics
Continuing Competency Ad Hoc Education Committee

Module Creation and Research

Portage College Prehospital Care Programs
Lac La Biche, Alberta

In collaboration with...

Alberta College of Paramedics
Continuing Competency Ad Hoc Education Committee

About the Authors (Portage College)

Portage College (formerly Alberta Vocational Center, Lac La Biche) was established in 1968. The College currently offers over 30 certificate and diploma programs in six areas of study: Business, Human Services, Native Cultural Arts, Trades and Technical, Health and Wellness and Academic Upgrading. Over 1800 students are served annually through campuses in 13 northern Alberta communities, with another 1,300 taking short term or customized training programs each year.

Portage College has been offering prehospital care training program since the mid 1980s. Portage College is currently approved by the Alberta College of Paramedics for the following Paramedicine programs:

Emergency Medical Responder (EMR)
Emergency Medical Technician (EMT)
Emergency Medical Technologist-Paramedic (EMT-P)

Disclaimer

Portage College and the Alberta College of Paramedics have attempted to ensure that the information is in context relevant to the practitioner and is as concise as possible. Portage College has used a variety of resource materials in order to provide a solid base of up-to-date information.

If any of the information contained within this module contradicts the direction you have received from your employer/medical director, the policy of your employer should take precedence over the information in this module.

As a regulated practitioner of the Alberta College of Paramedics, while under the *Health Disciplines Act*, you may only deliver health services which fall within your scope of practice and is in accordance with the provisions of the *Health Disciplines Act* or the *Health Professions Act* when the HPA is implemented.

Any content contained in this module that is beyond your scope or not within your current competence does not authorize you to deliver those health services. That is, if a given health service is not within your scope of practice and/or you have not yet attained the competency, you may not deliver that health service.

Alberta Occupational Competency Profile (AOCP)

Training Program

Learning Goal

This educational training is intended to review and upgrade the competencies of The Alberta College of Paramedics registered practitioners in order to meet the requirements of the new regulation under the Health Professions Act (2000) including the Alberta Occupational Competency Profile (AOCP) and scope of practice.

Program Objective

To provide standardized education to registered practitioners to ensure that all regulated practitioners of the Alberta College of Paramedics meet the regulation and defined scope of practice for the profession.

Program Format

The Alberta Occupational Competency Profile (AOCP) training program will combine independent study modules and scheduled lab skills assessment sessions. Certification will be granted on successful completion of all program requirements.

Independent Study Modules

There are ten EMTP – AOCP continuing education modules to be completed.

1. Intraosseous
2. Transcutaneous Pacing
3. Blood Products
4. Urinary Catheterization
5. Monitoring Chest Tubes
6. Arterial Blood Gas Samples
7. Intrapartal Examination
8. Suturing and Hemostat Application
9. Femoral Venipuncture
10. Nasotracheal Intubation

Lab Skill Assessment

All skills identified for each module will be assessed during the lab skills assessment for that module.

Exam

Mastery of the each module's content will be assessed through multiple-choice exams during the lab sessions. These exams are open book and can be found in each module following the module summary.

EMT-P – Femoral Venipuncture Competencies

This module meets the following competencies of the Alberta Occupational Competency Profile (AOCP).

I-10 Perform Intravenous Therapy

I-10-2 Demonstrate the knowledge and ability to perform intravenous therapy

- Central intravenous line

Femoral Venipuncture Module

Introduction

Femoral venipuncture is one of those rarely used skills that has a place in the ever-changing world of EMS. It is considered a central line, and like external jugular cannulation, gives us access to the central circulation, which may be required when dealing with critically ill patients. As healthcare continues to evolve we are seeing more and more patients discharged when they are still quite ill and more acute patients being transferred between facilities. A greater number of our populations are also aging which contributes to an increasing number of acutely ill or injured people. It is circumstances such as these that give rise to more opportunity and need for advanced skills such as central line cannulation.

Learning Objectives

Upon completion of this module the Paramedic will be able to:

1. Discuss and perform femoral venipuncture

Learning Activities

Recommended Resources

Each module identifies specific content students must cover to meet the module learning objectives.

Key Terms

Students are to define the *Key Terms* identified for each learning objective.

Exam

Mastery of the module content will be assessed through a multiple-choice exam during the lab sessions. This exam is open book and can be found in this module following the module summary.

Lab Skills Practice

Students are to review the skills identified in the *Lab Skills Checklist* provided in Appendix A. Review of these checklists is essential preparation for the lab skill assessments, which are mandatory for successful completion of this module.

Objective 1

Discuss and Perform Femoral Venipuncture

Choosing when and where to gain femoral vein access is important. Weighing transport time to the nearest facility, time and skill required to perform the procedure, as well as patient need all help us determine if this skill should be performed in any specific situation. It is unlikely we will see many initiated prehospitally in urban centers, or even rural Alberta due to the time and complexity involved. It is far more likely that this procedure will be initiated during inter-facility transfers prior to leaving the sending facility. Having said that, it is also reasonable that a patient in the field could require a central line. Situations where the patient requires aggressive fluid resuscitation or medication and access to a peripheral vein is not available or suitable, cannulation of the femoral vein offers a valid alternative.

Indications

When making the choice to cannulate the femoral vein we have to consider if this patient has the need for a central line.

- Does the patient need large volumes of fluid for resuscitation through a large bore catheter?
- Does the patient require large bore central access for the administration highly irritating or vasoconstrictive medications because of the low risk of extravasation and the benefit of dilution due to the high volume of the central circulation?
- Is there a lack of suitable peripheral venous access?

If the answer is yes, to any of these questions then this is a candidate for femoral access.

Relative Contraindications

When assessing the patient consider the presence of these factors:

- distorted anatomy
- excessive weight/subcutaneous tissue
- proximal vascular injury
- bleeding disorders
- thrombolytic or anticoagulation
- combative patient
- vascular disease
- prosthetic grafts
- previous surgery to the area
- cellulitis/burns
- experience of provider

In the presence of any of these, the provider should reconsider the benefit of the procedure to the patient. This decision should be based on direction from medical control in the form of standing or verbal orders.

Note: The only absolute contraindication for femoral venipuncture is any patient who is ambulatory.

Cannulation Techniques

There are two basic techniques for the accessing the central venous circulation. The first technique we are familiar with; it involves using an *over-the-needle catheter* to cannulate the vein. The second is the Seldinger technique, which allows the placement of a longer and larger gauge catheter by first introducing a guidewire. This technique requires great deal of skill and experience to perform, not to mention an increase in possible complications and time involved. It is for these reasons we will focus on using the over-the-needle catheter.

Seldinger

The *Seldinger technique* involves placing a straight needle into the vein. Once in place, a guidewire is passed through the lumen of the needle. The needle is removed once the wire is in the vein and protruding through the skin. Once this is done a small incision is made at the point where the guide wire enters the skin. A special dilator is then passed over the wire, through the incision and into the vein to dilate the hole, which the catheter will pass through. The dilator is removed and replaced by the catheter followed by removal of the guidewire. The catheter is then sutured in place and the infusion begun. This technique is less desirable in the prehospital setting.

Landmarking

The anatomy used to find the femoral vein is fairly easy to locate. First you must find the *inguinal ligament*. It runs from the *anterior superior iliac spine (ASIS)* to the *pubic tubercle* (attachment point) of the symphysis pubis. Halfway between these two points is a neurovascular bundle consisting of a nerve, femoral artery and femoral vein (lateral to medial). To landmark, locate the midpoint of the inguinal ligament, palpate just distal to it and find the pulsing femoral artery. Immediately medial to this artery, approximately 1-2 cm is the femoral vein deep beneath the tissue. This is the site for femoral vein cannulation.



Procedure

The equipment and supplies necessary include: everything necessary to initiate a peripheral IV, sterile drapes, a 10 ml syringe, provodine-iodine solution and a large bore, over-the-needle catheter such as a 16g, 5-inch angiocatheter.



1. Prepare all equipment and cleanse the area with Povidone-iodine or similar solution using and maintaining sterile technique.



2. Place the catheter onto the 10 ml syringe. Locate the femoral artery and move medially 1-2 cm. Advance the needle through the skin at a 45° angle (pointing toward the umbilicus). Continue to advance the cathelon parallel to the femoral pulse while applying continuous, gentle negative pressure using the plunger.



3. Obtain flash and advance the catheter slightly as in peripheral IV cannulation. The blood entering the syringe should be dark and non-pulsatile.



4. Slide the cathelon off and into the vein, connect the IV tubing and secure the hub and line in place using sutures if the option is available. Set fluid infusion to the desired rate.





Potential Complications

Bleeding from the punctured vein, or accidental puncture of the adjacent artery can cause a hematoma to form. If the hematoma is contained within the sheath, compression of the femoral nerve can occur and neuronal injury may result.

If thrombosis or phlebitis occurs and it extends to the iliac veins or the inferior vena cava, later use of the saphenous vein is no longer a feasible option.

As the femoral vein and artery lie side by side, accidental cannulation of the femoral artery can occur especially in a patient in cardiac arrest where there is no palpable pulse. Femoral arterial pressure and oxygen tension may be so low that the aspirated blood resembles venous blood and therefore arterial cannulation may go unnoticed.

Infusion of epinephrine into the femoral artery may cause ischemic injury to the limb.

Finally, if giving medications into the femoral artery during cardiac arrest, you must use a long catheter that passes above the diaphragm or a 20 ml flush of IV fluid must be used to ensure delivery of the medication to the central circulation.

ACLS: Principles and Practice, 2003, American Heart Association

Points to Remember

- The vein is deep as compared to peripheral cannulation
- As we move distally from the ligament the vein becomes more posterior to the artery and thus harder to cannulate without accidental cannulation of the artery
- During CPR venous blood can be pulsatile and arterial blood can be darker than expected
- Use of a catheter smaller than an 18g will inhibit placement of a more permanent catheter using the Seldinger technique
- If at first you do not get flash, move laterally and posterior to the pulse

Objective 1: Key Terms

- Over-the-needle catheter
- Seldinger technique
- Inguinal ligament
- Anterior superior iliac spine (ASIS)
- Pubic tubercle

Summary

Due to the expanding roles and responsibilities of EMS professionals we are being required to become more responsible for and adept at the skills we are allowed to practice. Even though this is not a skill we will be using frequently, it is, along with all invasive skills, one that we must be confident in performing on those rare occasions when we find it valuable.

Exam

1. Why is the femoral vein cannulation an asset in the critically ill patient?
 - a. It is superficial and easy to cannulate
 - b. It is part of the central circulation and thus allows greater volume infusion and more secure medication administration
 - c. It is not an asset
 - d. It is the standard of care for peripheral venipuncture

2. In relation to the inguinal ligament, the needle should be inserted:
 - a. Distally
 - b. Medially
 - c. Laterally
 - d. Proximally

3. At what angle should you advance the catheter through the skin during cannulation of the femoral vein?
 - a. 35°
 - b. 40°
 - c. 45°
 - d. 90°

4. The Seldinger technique is more dangerous and time consuming to perform than the over-the-needle technique.
 - a. True
 - b. False

5. The neurovascular bundle under the inguinal ligament is in what order (from lateral to medial)?
 - a. Vein, artery, nerve
 - b. Artery, vein, nerve
 - c. Vein, nerve, artery
 - d. Nerve, artery, vein

Glossary of Terms

Objective 1: Key Terms

Over-the-needle catheter - Consists of a Teflon catheter placed over a needle. It has a clear hub to see blood flashback, comes in a variety of sizes, and can be inserted into any vein

Seldinger technique - Allows the placement of a longer and larger gauge catheter by first introducing a guidewire

Inguinal ligament – The ligament that runs from the anterior superior iliac spine to the pubic tubercle

Anterior Superior Iliac Spine – Part of the pelvis (iliac crest) used as a point of reference when landmarking to find the inguinal ligament

Pubic tubercle – Attachment point of the inguinal ligament to the symphysis pubis

References

American Heart Association, (2002), *PALS Provider Manual*, Heart and Stroke Foundation of Canada

American Heart Association, (2003), *ACLS Principles and Practice*

Roberts (2004), *Clinical Procedures in Emergency Medicine*, (4th edition), St Louis MO: Elsevier Inc.

Appendix A

Lab Skills Checklist

FEMORAL VENIPUNCTURE

- Apply PPE precautions
- Perform patient assessment
- Obtain history and baseline vital signs
- Determine treatment plan
- List indications, contraindications and complications for this procedure
- Explains procedure to patient and obtain consent
- Assemble equipment/ supplies and prepare patient for procedure
- Place the catheter onto the 10 ml syringe and cleanse the site using an aseptic technique
- Locate the femoral artery and move medially 1-2 cm. Advance the needle through the skin at a 45° angle (pointing toward the umbilicus). Continue to advance the cathelon parallel to the femoral pulse while applying continuous, gentle negative pressure using the plunger
- Obtain flash and advance the catheter slightly as in peripheral IV cannulation. The blood entering the syringe should be dark and non- pulsatile
- Slide the cathelon off and into the vein. Attach the IV tubing, secure the hub and line in place using sutures if the option is available
- Remove the sterile drapes and infuse fluid at the desired rate
- Reassess patient
- Document: time, site, rate, type and volume of fluid infused, and patient outcome as a result of this procedure

Comments:

Instructor Name & Initials: _____ *Date:* _____