Turn the Chair Around: Advance Preparation of Chemotherapy to Improve Outpatient Infusion Center Throughput

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Disclosures

- The presenters have no real or perceived conflicts of interest related to this presentation.

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Learning Objectives

At the end of this session, participants should be able to:

1. Describe the process to evaluate potential chemotherapy or infusion center medications for advance preparation.

2. Describe the workflow and implementation steps to successful advance chemotherapy and infusion center medication preparation.

3. Identify endpoints for data collection to show positive results following implementation of advance chemotherapy and infusion center medication preparation.

Audience Poll Question: #1 of 5

How many facilities currently have some type of advance chemotherapy or infusion medication preparation?

a. Yes, fully implemented
b. No, not evaluated or implemented
c. Evaluated but not implemented
d. In the process of implementation

Facility Orientation

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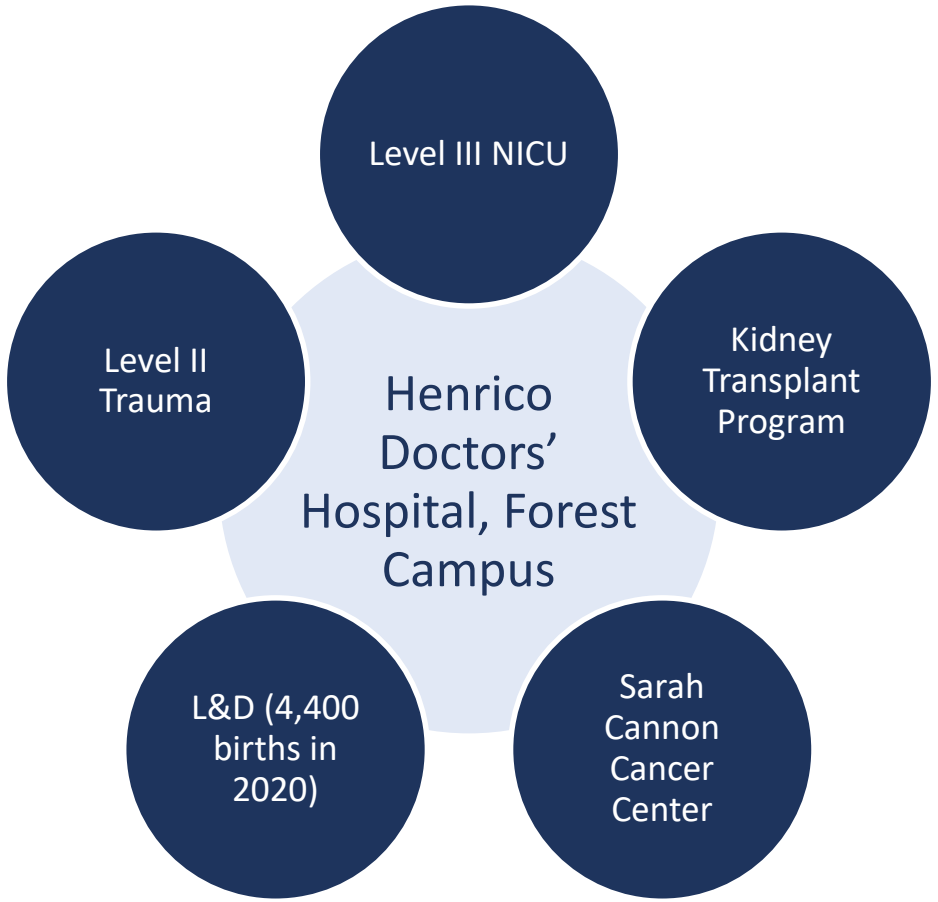
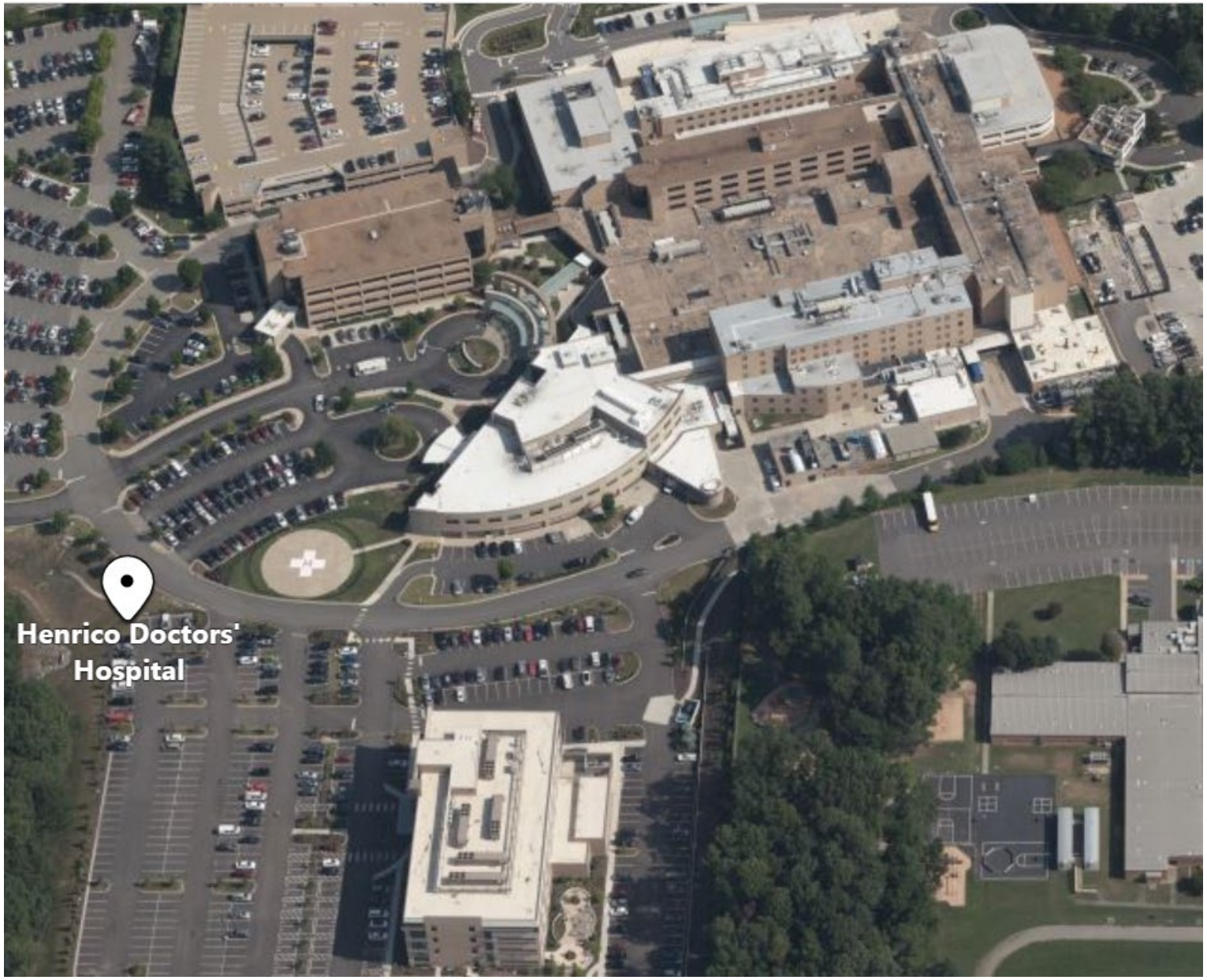
Hospital Overview



Campus Birdseye view



Infusion Center State of Affairs

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2021 American Cancer Society Facts

- American Cancer Society estimates that in 2021 nearly 16.9 million patients in the United States have cancer
- In 2021, nearly 1.9 million new cancer cases will be diagnosed
- 1 in 3 people will be diagnosed with cancer in their lifetime
- Estimated 59 million oncology clinic visits in 2021
- Estimated cancer-related direct medical costs in the United States will be $246 billion by 2030

Source: American Cancer Society. Cancer Facts and Figures 2021. https://www.cancer.org/research/cancer-facts-statistics/all-cancer-facts-figures/cancer-facts-figures-2021.html

Outpatient Infusion Services

- Most patients are able to receive treatments in a clinic setting due to advances in chemotherapy and radiation therapy.
- Extended wait times for infusion initiation are consistently associated with patient dissatisfaction and adversely affect patients' perception of quality.
- Estimated 70.4% of chemotherapy patients experience a longer-than-expected wait time at infusion centers.

Sources: Am J Health-Syst Pharm. 2015; 72: 1138-46, J Oncol Pract. 2019; 15:e576-e582.

MD Anderson Cancer Center Experience

- Pre-implementation investigators reported:
  - Excessive patient wait time
  - Patient dissatisfaction
  - Employee frustration
  - Challenges associated with obtaining finalized treatment orders for prescheduled appointments (i.e., placeholder appointments without associated physician treatment orders).
- Goal was to decrease mean patient wait time from check-in to treatment by 25%.
- Methods included:
  - Studying appointment cycle time
  - Stratifying appointments by type (i.e., prescheduled with no finalized treatment orders or scheduled with finalized treatment orders)
  - Mean wait times at baseline and after intervention period collected
  - Conducted staff and patient interviews
  - Conducted staff and patient observations

Source: J Oncol Pract. 2012; 8:e1-e7.

MD Anderson Cancer Center Experience

- Multiple interventions implemented due to a series of changes being more effective than a single change item

Table 2. Intervention Strategies Implemented

Category	Intervention	Description
Improving appointment processing efficiency	IV assessment	Perform early evaluation of appropriateness and accessibility of IV line
	Quick treatments	Streamline short-duration appointments
Improving lines of communication	Completion of chemotherapy orders	Directly page oncologists to ask them to sign/complete orders
Applying information technology	Pharmacy whiteboard	Provide pharmacy with early notification of patient readiness for medications

Abbreviation: IV, intravenous.

- Conclusion was a 26.8% decreased mean wait after implementation.

Source: J Oncol Pract. 2012; 8:e1-e7.

UNC Cancer Center Experience

Three phase approach using Lean Six Sigma methodology:

- Phase 1: Chemotherapy turnaround time were examined one year after interim goal of 45-minute turnaround time
- Phase 2: Implementation of various experiments such as a five-day Kaizen event, using lean principles in an effort to decrease chemotherapy preparation in a controlled setting
- Phase 3: Implementation of process-improvement strategies identified during Kaizen event

Conclusion: turnaround time went from 60 minutes to 26 minutes

Source: Am J Health-Syst Pharm. 2015; 72:1138--46.

Sarah Cannon Cancer Center Overview

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Sarah Cannon Statistics 2020

Specialty	Annual Visits	Percent
Cardiology	30	0.7%
Endocrinology	93	2.0%
ER/Hospitalist	20	0.4%
Family Practice	303	6.6%
Gastrointestinal	126	2.7%
Genetics	127	2.8%
Gyn-Onc	1086	23.6%
Infectious Disease	582	12.6%
Internal Medicine	47	1.0%
Mammo (CEM)	122	2.6%
Neurology	256	5.6%

Specialty	Annual Visits	Percent
OB/GYN	123	2.7%
Onc/Hematology	669	14.5%
Opthamology	0	0.0%
Other	283	6.1%
Pediatrics	10	0.2%
Podiatry	11	0.2%
Pulmonary	84	1.8%
Renal	486	10.5%
Rheumatology	113	2.5%
Surgical	35	0.8%
Urology	3	0.1%

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Advance Preparation of Chemotherapy to Improve Outpatient Infusion Center Throughput

Process & Implementation

Emily Chambers, PharmD, BCOP

Audience Poll Question: #2 of 5

Which of the following is the most important factor to consider when determining preparing chemotherapy in advance of a patient's visit?

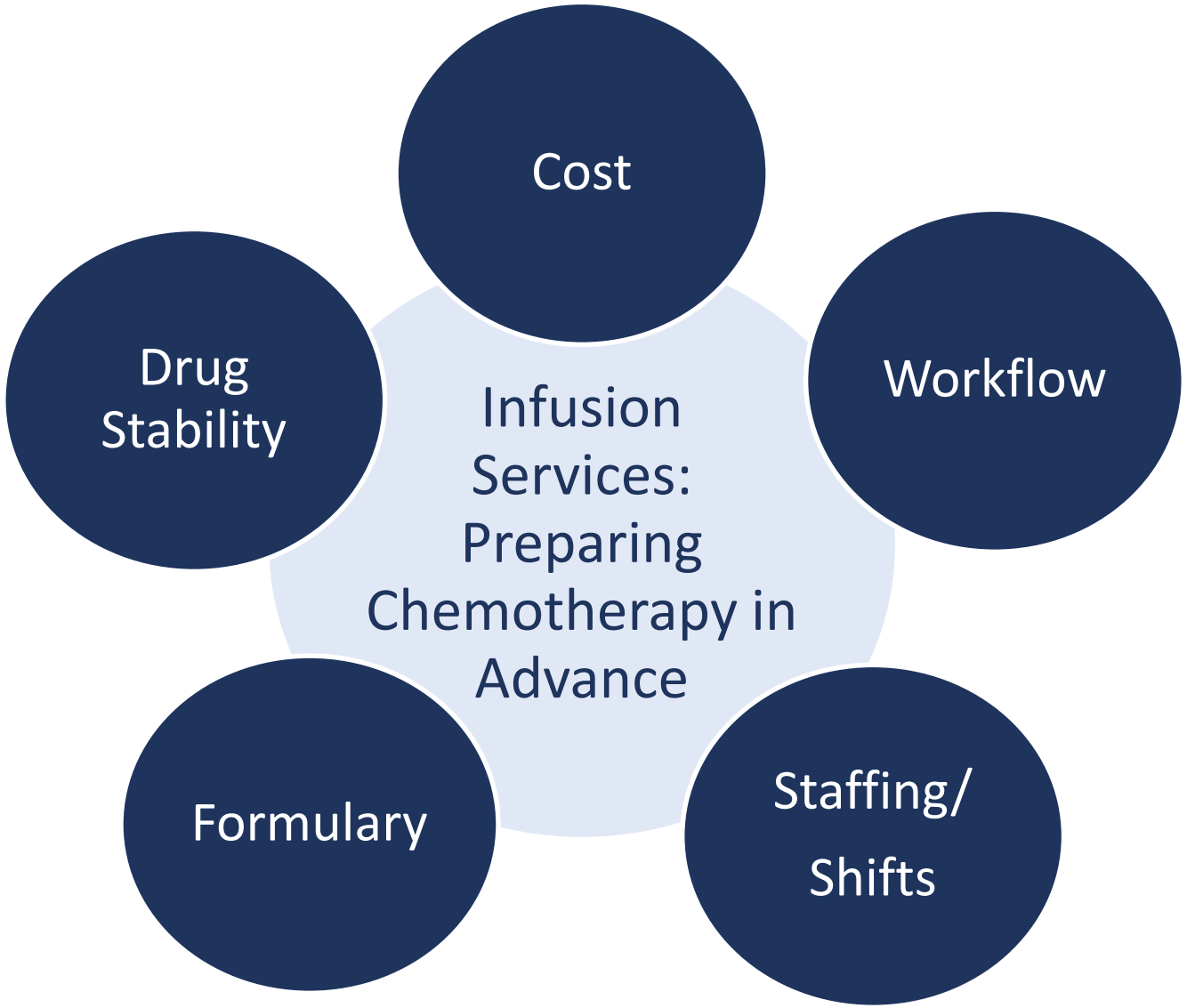
a. Cost of the chemotherapy

b. Departmental workflow

c. Drug stability

d. Formulary items that are routinely stocked

Factors to Consider



Non-chemotherapy Medications

Previously Loaded Medications	Newly Added Medications
Dexamethasone vial	Denosumab (60 mg and 120 mg)
Olanzapine tablets	IV Fosaprepitant
Palonosetron	*Compounded Pre-medications (Dexamethasone and ondansetron)
Ceftriaxone, Cefepime, and Ertapenem	
Micafungin	
Daptomycin	
Pegfilgrastim (or biosimilar)	

** Compounded in pharmacy and not loaded into the automated dispensing cabinet*

Working Through the Process

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Considerations

- Cost
- Volume of use (formulary)
- Feasibility (workflow, shift, stability)
- Additional items accompanying advance preparation of chemotherapy

Cost & Volume of Use

Cost

- Exclude costly chemotherapy
- Set a cost limit
- Waste

Volume of Use

- Greatest impact
- Lab work previously completed

Feasibility

Stability

- Prescribing information
- Stability limitations

Workflow

- Pulling drugs
- Compound in one session or divide
- Computer systems

Shift

- Workload
- Skill sets
- Split responsibilities across shifts

Additional Items Accompanying Advance Preparation

Preparation of Pre-medications	Preparation of bag	Verification
• Compounding anti-emetic pre-medications	• Base Fluid • IV tubing	• Computer workflow management

Exploring the Process

Frequently Used Medications	Average Doses Per Month	Cost (Per Dose)*	Stability
Carboplatin	32	$50 - $140	8 Hours (prepared solutions)
Paclitaxel	40	$40 - $125	27 Hours (prepared solution at room temperature)
Zoledronic Acid	11	$75 - $125	24 Hours (refrigerated)
Ondansetron/ Dexamethasone Pre-medication	50-100	$2.50	24 Hours (prepared solution at room temperature)

**AWP pricing based on calculated average dose*

Source: Assorted Prescribing Information and AWP Pricing per Lexicomp®

Implementation

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Audience Poll Question: #3 of 5

Advance preparation of chemotherapy or other infusion medications will necessitate a workflow change and a practice change by which healthcare professionals?

a. Pharmacy
b. Nursing
c. Prescribers
d. All of the above

Implementation

- **Collaboration**
  - Pharmacy and outpatient infusion services
  - Pharmacy staff
  - Providers
  - Instant messaging implemented to communicate patient arrival
- **Pharmacy Shifts**
  - Teamwork across all shifts
  - Communication among staff
  - Searching out areas for improvement/creativity
- **Support**
  - Hospital administration

Process

Infusion confirms patient visit

- Contacts patient and ensures visit
- Asks for a stated weight
- Overall health

Infusion communicates to pharmacy

- Infusion writes “confirmed” on daily schedule that is sent to pharmacy
- Includes patient’s stated weight

Pharmacy prepares chemotherapy in advance

- 2nd shift (1700 – 2300) prepares IV bag and primes line/pre-medications
- 3rd shift (2300 – 0600) prepares chemotherapy
- Completed drugs are placed in designated areas for morning pick up

Audience Poll Question: #4 of 5

Which statement is most accurate when implementing a new process for advance preparation of chemotherapy?

a. The process should include teamwork across multiple shifts
b. Effective communication is necessary for success
c. Collaboration among hospital departments is required
d. Support from leadership is imperative
e. All of the above

Results

Chemotherapy Wait Times

Pre-implementation

Goal set

Average wait time end of 2020

Results

- Patient volumes
  - Affected by COVID-19
- Waste
  - Minimal
- Infusion nurse productivity
  - Conserved nursing hours
  - Closing earlier as patient’s visit completed earlier in the day

Future Directions

- Continue to work collaboratively
  - Outpatient infusion services
  - Providers
  - Pharmacy team
- Identify opportunities for continued improvement
  - Explore other agents
    - Day #2 and #3 of etoposide
  - Infusion/Pharmacy improvement meetings
  - Adapt to available medication delivery systems
  - Provide education
  - Work with administration to assist in securing orders in advance
  - Shortages

Audience Poll Question: #5 of 5

After learning about advance preparation of chemotherapy, what changes do you plan on making for your institution's outpatient infusion center?

a. I plan on implementing advance preparation of certain chemotherapy agents
b. I plan on investigating the possibility of preparing chemotherapy in advance
c. I plan to investigate and implement advance preparation of non-chemotherapy items only
d. I do not plan to make any changes at my institution

Assessment Question #1

One factor of a good process to evaluate potential advance chemotherapy or infusion center medication preparation includes:

a. Reviewing brand name only medications
b. Decisions made by only one discipline
c. Evaluation of frequently used medications
d. Driven only by nursing preference

Assessment Question #1: Correct Response

One factor of a good process to evaluate potential advance chemotherapy or infusion center medication preparation includes:

a. Reviewing brand name only medications

b. Decisions made by only one discipline

c. Evaluation of frequently used medications

d. Driven only by nursing preference

Assessment Question #2

Endpoints for data collection to show positive results include all of the following EXCEPT:

a. Average patient wait time
b. Patient IV access (peripheral vs. central line)
c. Patient satisfaction scores
d. Nursing productivity time

Assessment Question #2: Correct Response

Endpoints for data collection to show positive results include all of the following EXCEPT:

a. Average patient wait time

b. Patient IV access (peripheral vs. central line)

c. Patient satisfaction scores

d. Nursing productivity time

Assessment Question #3

Having _____ creates a successful advance chemotherapy and infusion center medication preparation:

a. Multidisciplinary team
b. Clear communication
c. Collaboration on all shift
d. All of the above

Assessment Question #3: Correct Response

Having _____ creates a successful advance chemotherapy and infusion center medication preparation:

a. Multidisciplinary team

b. Clear communication

c. Collaboration on all shift

d. All of the above

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Thank you…

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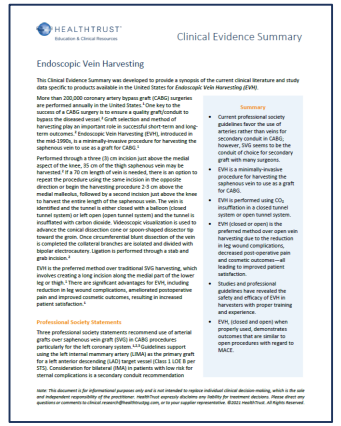
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Clinical Evidence Summary

Endoscopic Vein Harvesting

This Clinical Evidence Summary was developed to provide a synopsis of the current clinical literature and study data specific to products available in the United States for Endoscopic Vein Harvesting (EVH).

More than 200,000 coronary artery bypass graft (CABG) surgeries are performed annually in the United States.[1] One key to the success of a CABG surgery is to ensure a quality graft/conduit to bypass the diseased vessel.[2] Graft selection and method of harvesting play an important role in successful short-term and long-term outcomes.[3] Endoscopic Vein Harvesting (EVH), introduced in the mid-1990s, is a minimally-invasive procedure for harvesting the saphenous vein to use as a graft for CABG.[3]

Performed through a three (3) cm incision just above the medial aspect of the knee, 35 cm of the thigh saphenous vein may be harvested.[3] If a 70 cm length of vein is needed, there is an option to repeat the procedure using the same incision in the opposite direction or begin the harvesting procedure 2-5 cm above the medial malleolus, followed by a second incision just above the knee to harvest the entire length of the saphenous vein. The vein is identified and the tunnel is either craved with a balloon (closed tunnel system) or left open (open tunnel system) and the tunnel is insufflated with carbon dioxide. Videoscopic visualization is used to advance the conical dissection cone or spoon-shaped dissector tip toward the groin. Once circumferential blunt dissection of the vein is completed the collateral branches are isolated and divided with bipolar electrocautery. Ligation is performed through a stab and groin incision.[3]

EVH is the preferred method over traditional SVG harvesting, which involves creating a long incision along the medial part of the lower leg or thigh.[3] There are significant advantages for EVH, including reduction in leg wound complications, ameliorated postoperative pain and improved cosmetic outcomes, resulting in increased patient satisfaction.[3]

Professional Society Statements

Three professional society statements recommend use of arterial grafts over saphenous vein graft (SVG) in CABG procedures particularly for the left coronary system.[4,5] Guidelines support using the left internal mammary artery (LIMA) as the primary graft for a left anterior descending (LAD) target vessel (Class 1 LOE B per STS). Consideration for bilateral (BMA) in patients with low risk for sternal complications is a secondary conduit recommendation

Summary

- Current professional society guidelines favor the use of arteries rather than veins for secondary conduit in CABG; however, SVG seems to be the conduit of choice for secondary graft with many surgeons.
- EVH is a minimally-invasive procedure for harvesting the saphenous vein to use as a graft for CABG.
- EVH is performed using CO_2 insufflation in a closed tunnel system or open tunnel system.
- EVH (closed or open) is the preferred method over open vein harvesting due to the reduction in leg wound complications, decreased post-operative pain and cosmetic outcomes—all leading to improved patient satisfaction.
- Studies and professional guidelines have revealed the safety and efficacy of EVH in harvesters with proper training and experience.
- EVH, (closed and open) when properly used, demonstrates outcomes that are similar to open procedures with regard to MACE.

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