

Surgical Coaching: What Is It and How Can It Improve My Practice?

Learning Objective: At the conclusion of this continuing medical education activity, the participant will be able to define surgical coaching and differentiate coaching from other types of professional development, identify different implementation strategies of surgical coaching and in which situations they are most effective, and assess how surgical coaching programs can bring value to urology practice.

This AUA Update aligns with the American Board of Urology Module on Core/General Urology. Additional information on this topic can be found in the AUA Core Curriculum sections on Business and Communication, and Laparoscopy and Robotic Surgery.



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KEY WORDS: surgical coaching, education, outcomes

INTRODUCTION

Surgery is a high-performance field that requires years of training to hone technical skills, decision-making, and judgment, as well as developing the emotional resolve to deal with both the successes and failures of surgical management. Yet, providing support and help to the surgeon through a coaching framework in clinical practice is not an established part of the surgical rubric.

Coaching is a form of development in which an experienced person, called a coach, supports a learner in achieving a specific personal or professional goal by providing training and guidance.¹ Coaching is widely utilized in other high-performance professions such as athletics, music, and especially for executives in business management and leadership roles.² Coaching in these fields continues at a high level throughout an individual's entire career, no matter how far they are into their career. In surgery, coaching is often concentrated to the training phases (medical school, residency, fellowship) and tapers off after initial certification. For surgeons, professional development often utilizes didactic learning at conferences and courses, while institutional review of a surgeon's ability may focus on a performance review of their surgical outcomes.³ If the most successful athletes or business executives have coaches throughout their career to achieve excellence, why shouldn't surgeons—who are responsible for the well-being of countless patients—have the same driving philosophy?

Surgical coaching is an emerging field and increasingly recognized as an important part of contemporary clinical practice. **Surgical coaching relies on a cooperative partnership between 2 surgeons that breaks down hierar-**

chical barriers to emphasize professional development through individualized, thoughtful, and collaborative feedback.^{3,4} In general surgery, there is a growing body of evidence that supports the success of surgical coaching.^{2,5} In urology, there is a small body of literature regarding surgical coaching, and most work centers around the use of video review to evaluate surgical technique.^{6,7} Herein, we evaluate the evidence base of surgical coaching in surgery and urology to understand the context and value this strategy provides the surgeon. We summarize existing surgical coaching initiatives and highlight key experiences from established surgical coaching programs. We also discuss future directions of surgical coaching in urology.

OVERVIEW OF SURGICAL COACHING

In the current model of surgical professional development, the amount of dedicated coaching that surgeons receive dwindles as surgeons advance through their careers (see Figure). Building on validated frameworks in medical education, there are 4 main pillars of effective coaching: goal setting, collaborative analysis, constructive feedback, and action planning.^{3,4,8}

Coaching is often confused for 2 other mainstays of education: teaching and mentorship. **Coaching is different from traditional teaching with its emphasis on timely, individualized feedback based on the coach's direct observations of the coachee.** Although often incorporated into surgical coaching, the focus of coaching is not knowledge transmission. Rather it is a mechanism through which an experienced surgeon can constructively guide a junior surgeon to a defined goal. Surgical coaching relationships often expand to include mentorship—the passage of advice and counseling.⁹

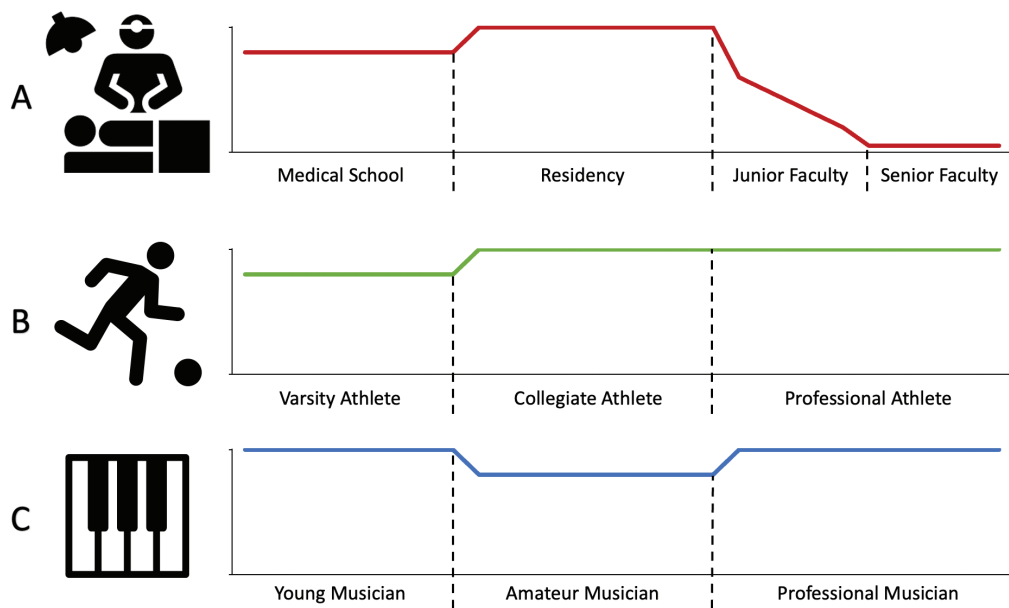


Figure. The different patterns of coaching an individual undertakes during various time periods in careers in the fields of surgery (A), athletics (B), and musical performance (C).

ABBREVIATIONS: Michigan Bariatric Surgery Collaborative (MBSC), Michigan Urological Surgery Improvement Collaborative (MUSIC), robot-assisted radical prostatectomy (RARP), Wisconsin Surgical Coaching Program (WSCP)

TYPES OF SURGICAL COACHING

Surgical coaching exists in different forms and can occur within various medical professional relationships. In-person coaching is the most familiar form of coaching. Medical students and residents are, by design, recipients of surgical education and often the first coachees that come to mind. Junior faculty are also often mentored by senior faculty early in their practice; however, coaching relationships are less often structured or intentionally created in this setting. Nevertheless, the paradigm is shifting with a focus on near-peer evaluation, feedback, and coaching.²

Not all coaching has to happen in person. As surgery becomes increasingly minimally invasive, it naturally lends itself to the ability to be recorded or live streamed outside of the operating room. These capabilities facilitate opportunities for nonsynchronous and long-distance evaluation and feedback. Beyond teleconferencing and reviewing surgical videos, surgeons now have the capability to virtually scrub into operating rooms across the world with developments of new web-based technology.¹⁰

Additionally, it is important to highlight that while the participants in a surgical coaching relationship can vary, so can the subject matter itself. **Valuable surgical coaching relationships can cover a broad range of topics from technical to nontechnical aspects of a meaningful surgical career.** The least ambiguous benefits from surgical coaching programs may often be the intangible and nontechnical aspects of surgical success. However, providers, payers, and patients would expect to see empirical benefits of coaching in terms of changes in surgical skill, which should translate to improved patient outcomes. Studies assessing surgical coaching programs are limited and conducted by a handful of investigators in the field.

SURGICAL COACHING PROGRAMS

Continuous technological advances and the increasing use of videography in the operating room are driving changes in how surgery is evaluated and, as a result, methods for coaching. Studies have demonstrated the utility of video-based teaching models for medical students, residents, and faculty.¹¹ A recent review of 134 articles on telementorship in urology, general surgery, and other surgical subspecialties demonstrated that while there is a lot of literature on telementorship to enhance surgical skills, less than 7% of these studies addressed enhancing careers through professional development or increasing clinical knowledge.¹²

Surgical collaboratives are ideally suited to drive coaching programs. Collaborative quality initiatives provide useful insights into variations in practice that can guide improvements in outcomes and reductions in costs.¹³ Surgical collaboratives that collect data to improve care already have the culture and organization in place to expand into coaching programs. The first formal coaching program, the Wisconsin Surgical Coaching Program (WSCP), was created in 2015 for surgeons in Wisconsin. In its first iteration, coaches were selected by peer nomination, and coachees were voluntary participants. Subsequently, the Michigan Bariatric Surgery Collaborative (MBSC) developed a video-based surgical coaching program for surgeons in their statewide collaborative. Similar efforts

in general surgery include a video-based coaching initiative from the Illinois Surgical Quality Improvement Collaborative and coaching programs developed by the Harvard SCOPE (Surgical Coaching for Operative Performance Enhancement) program for individual institutions.²

One method of assessing the technical quality of video-based surgery has been the evaluation of skill using expert peer and lay person crowd-sourced review. In a study from the Michigan Urological Surgery Improvement Collaborative (MUSIC), a consortium of 46 urology practices in Michigan, video clips of robot-assisted radical prostatectomy (RARP) from 12 urological surgeons were rated for global and procedure-specific skill by 25 peer surgeons and 680 crowd-sourced lay reviewers. Lay reviewers were prequalified crowd workers through Amazon Mechanical Turk. Video clips consisted of 4 parts of RARP (bladder neck dissection, apical dissection, nerve sparing, and urethrovesical anastomosis). Individual video clips were de-identified and evaluated by at least 4 surgeon peer reviewers and 30-55 lay reviewers. There was a strong correlation between peer surgeons and the crowd for both global and procedure-specific technical skills, demonstrating that experts and lay persons could agree on what constitutes high levels of technical skill on a video.¹⁴ This study also demonstrated that crowdsourcing could be a method of evaluating surgical skill at a scalable level. While it is remarkable that the crowd agreed with expert peer reviewers on assessment of technical surgical skills, coaching at its core requires collaborative analysis, action planning, and dynamic communication between peers. As such, successful coaching programs could use crowdsourcing for review of technical skill as long as other interpersonal elements of coaching are satisfied by peer-to-peer communication.

In urology, most of the assessment of surgical skill has been directed at evaluating and validating assessment tools for minimally invasive surgery.^{6,7,14,15} Groups like MUSIC have worked to promote informal surgical coaching through video review by facilitating video-based coaching sessions at collaborative meetings led by surgeons who have high technical skill scores and/or excellent patient outcomes. In particular, this has been used with the goal to improve patient outcomes after RARP, such as early urinary continence rates and positive surgical margin rates. Multiple surgeons throughout the state have provided full-length videos of their surgeries, which are now housed in an open-source blinded video library, with the surgeon videos linked to patient outcomes so they can serve as a teaching aid.¹⁶

IMPACT OF SURGICAL COACHING ON TECHNICAL SKILL

Effective surgical coaching should generate value in different aspects of the surgeons' practice. Surgical technique is often the most evaluated metric of effective coaching. **Multiple randomized controlled trials have demonstrated a beneficial effect of coaching on technical skill.**^{17,18} One study evaluated the performance of 18 faculty surgeons on laparoscopic suturing after receiving either peer surgical coaching or conventional teaching. Surgeons in the coaching group received 30 minutes of peer coaching based on published frameworks, while those in the conventional

group received an instructional video. The study found significant improvements in technical proficiency scores for those who received peer coaching compared to those who received conventional teaching.¹⁷ A separate randomized controlled trial assessed 18 surgical residents with coaching and conventional teaching for the laparoscopic jejunojunctionostomy portion of Roux-en-Y gastric bypass. Residents who received coaching performed better on technical performance, as measured on a procedure-specific scale, and made fewer technical errors when compared to those undergoing conventional teaching.¹⁸

Not all studies have demonstrated a positive impact of coaching on technical skills. A multicenter mixed methods analysis of 23 coachees across various subspecialties in the SCOPE program evaluated surgical skill before and after 3 structured peer coaching sessions for various surgeries. No improvements in objective measurements of surgical skill were demonstrated after the coaching intervention.¹⁹

In MUSIC, group-based coaching sessions through video review have been enthusiastically received by surgeons and appear to help surgeons identify technical skill improvement opportunities.²⁰ While the importance of matching surgeons with compatible learning styles was identified, these video-based coaching interventions have not led to significant changes in functional outcomes after RARP for patients statewide. However, some individual surgeons have stated that their outcomes have improved as a result of the video-based coaching.

More recently, Fainberg et al evaluated the qualitative aspects of a coaching program for RARP.²¹ Six surgeons were paired with a senior surgeon who received training on coaching methodology. On completion of the program, coachees self-reported subjective self-improvement and increased self-confidence. Furthermore, coachees rated the program highly and felt the pilot demonstrated the feasibility of a coaching program within urology. These studies represent a limited body of evidence, and larger longitudinal studies are necessary to better assess the impact of surgical coaching on technical skill.

IMPACT OF SURGICAL COACHING ON COMPLICATIONS

While there is empirical evidence that superior laparoscopic technical skill, as judged by peers, is associated with reduced postoperative complications and improvements in other perioperative measures of quality,²² surgical coaching strategies are yet to demonstrate a reduction in rates of surgical complications.

In a coaching initiative from the MBSC, which comprises 75 surgeons from 38 bariatric surgery programs in Michigan,²³ various risk-adjusted clinical outcomes for 2 years before and after a collaborative-wide surgical coaching intervention were evaluated. Surgeons with the lowest rates of complications were asked to serve as peer coaches. They were then trained in coaching by a board-certified senior surgeon and a certified professional executive coach. Twenty-six surgeons elected to participate in the program as coachees. They met with the surgical coaches every 4 months to review videos of themselves performing sleeve gastrectomy. When comparing the 26 coachees to 25 nonpar-

ticipants, there was no significant improvement in risk-adjusted outcomes. Still, it was shown that surgeons being coached made many changes to their practice and demonstrated a statistically significant improvement in their operative times. **Additionally, coachees reported positive nontechnical benefits of the intervention, such as improving how they delivered feedback to their team members.**²⁴ Table 1 summarizes the key studies from surgical coaching programs that have assessed technical skill and clinical outcomes.

IMPACT OF SURGICAL COACHING ON SURGEON WELLNESS

Perhaps a less ambiguous, but as important, benefit of surgical coaching is the associated improvement in surgeon wellness with coaching programs. Even when coaching does not produce a significant improvement in technical skills or outcomes, surgeons being coached perceive a benefit to their own surgical technique, well-being, and patient care.¹⁹ This was noted in the MUSIC group as a result of the RARP video-based program, and as a result the video-based coaching has been expanded to improving the technical skill of surgeons performing ureteroscopy and robotic partial nephrectomy. **Beyond a perceived improvement in wellness, surgical coaching programs have worked to break down unproductive, harmful, and hierarchical norms of surgical culture while teaching both coaches and coachees to practice vulnerability.**^{19,25}

Participants in surgical coaching programs identify the potential for coaching to improve burnout by reducing perioperative stress and building community through peer support.^{19,26} While having an impact on patients and their outcomes would be considered the gold standard for value in health care, improvements to surgeon wellness may be as important for the success and longevity of surgical careers. In this regard, the MUSIC group recently embarked on a program for surgeons to help them cope and deal with protracted surgical complications, which can be a source of depression and burnout in surgeons. This was led by expert surgeons who taught about the evidence base on dealing with complications and lessons learned from their own experiences.²⁷ Many of these aspects are not covered in traditional medical school or residency curriculum.

ASSESSING THE QUALITY OF SURGICAL COACHING

Just as surgical coaching is a teachable skill,²⁸ it is also amenable to evaluation. While perceived value and satisfaction of coachees are important end points, successful surgical coaching requires adhering to certain principles of coaching. Based on their framework of surgical coaching, the WSCP developed WiSCoR (the Wisconsin Surgical Coaching Rubric) as a tool for evaluating the performance of a surgical coach. **The tool evaluates coaches on their degree of alignment with 4 core principles of coaching: contributing equally to coaching exchange, promoting self-reflection/analysis, providing constructive feedback, and guiding goal setting and action planning.** Twenty-three coaches and 38 coachees from the WSCP and MBSC assessed coaching interactions using WiSCoR with high interrater reliability of the rubric.²⁹ Surgical coaching is a measurable skill by its own merit and requires assessment for continual improvement.

Table 1. Studies From Surgical Coaching Programs That Have Assessed the Impact of Coaching on Technical Skill and Clinical Outcomes

Study	Type of study	Intervention	No. surgeons assessed	Outcomes assessed	Study findings
Greenberg et al (2021) ²⁴	Interrupted time series analysis	Surgical coaching program	<ul style="list-style-type: none"> • 26 coachees • 14 coaches • 25 nonparticipants 	<ul style="list-style-type: none"> • Risk-adjusted complications, operative time, qualitative analysis of exit interview 	<ul style="list-style-type: none"> • No significant change in risk-adjusted complications for coaches (0.99 [0.62-1.37]), coachees (0.91 [0.64-1.17]), and nonparticipants (1.15 [0.83-1.47]). • Significant decrease in operative time. • Qualitative benefits included perceived improvements in skills and value by participants.
Bonrath et al (2015) ¹⁸	Randomized controlled trial (single center)	Surgical coaching program vs conventional teaching	<ul style="list-style-type: none"> • 18 residents (9 comprehensive surgical coaching vs 9 conventional teaching) 	<ul style="list-style-type: none"> • Objective measurements of surgical skill (OSATS, BOSATS, GERT) 	<ul style="list-style-type: none"> • Coachees scored significantly higher on procedure-specific skill scale and made fewer technical errors compared to those receiving conventional teaching.
Palter et al (2016) ¹⁷	Randomized controlled trial (single center)	Surgical coaching program vs conventional teaching	<ul style="list-style-type: none"> • 18 faculty surgeons (9 comprehensive surgical coaching vs 9 conventional teaching) 	<ul style="list-style-type: none"> • Objective measurement of surgical skill (OSATS) 	<ul style="list-style-type: none"> • Significant improvement in postintervention scores of surgical skill for those who received peer coaching
Pradarelli et al (2021) ¹⁹	Mixed methods analysis (multicenter)	Surgical coaching program	<ul style="list-style-type: none"> • 23 coachees (faculty surgeons) 	<ul style="list-style-type: none"> • Objective measurement of surgical skill (modified OSATS, NOTSS), qualitative analysis of exit interview 	<ul style="list-style-type: none"> • No significant change in coachees' technical and nontechnical skills over 3 coaching sessions. • High perceived impact of peer coaching on patient care and surgeon well-being.
Byrnes et al (2021) ²⁵	Narrative thematic analysis	Surgical coaching program	<ul style="list-style-type: none"> • 34 faculty surgeons 	<ul style="list-style-type: none"> • Qualitative analysis of exit interview 	<ul style="list-style-type: none"> • Safe space of intentional coaching allowed participants to practice vulnerability without the pressures of sometimes caustic professional norms. • Participants in this study viewed coaching as the way to improve the culture of surgery.

Abbreviations: BOSATS, Bariatric Objective Structured Assessment of Technical Skill; GERT, Generic Error Rating Tool; NOTSS, Nontechnical Skills for Surgeons; OSATS, Objective Structured Assessment of Technical Skill.

FUTURE DIRECTIONS

Surgical coaching programs are limited in national scope, but where they have been implemented, they have been welcomed by surgeons. However, multiple barriers to implementation have been highlighted in the early experience of these surgical coaching collaboratives. In evaluating WSCP, Pradarelli² and Greenberg⁴ et al found that the most common obstacles for participating surgeons were technical difficulties

with audio-visual technology, coordinating schedules of busy surgeons, and their individual workload and time constraints. Technical difficulties are inevitable yet often improve over time. Similarly, surgeons will always remain busy, but with increasing institutional buy-in and advancements in tele-mentoring for facilitation of nonsynchronous and distance coaching, the time cost and accessibility of surgical coaching is being increasingly addressed. Innovations in artificial

intelligence and the growing amounts of data in the surgical video space may facilitate a more rapid expansion of skills review and surgical coaching programs. The continued success of surgical coaching will depend on ongoing interest from surgical coachees. Based on the current literature, it is unclear if those who may benefit more from coaching are more or less likely to participate. Additional opportunities for expanding surgical coaching programs include helping surgeons reentering surgery after extended time out of surgical practice or surgeons late in their careers who may not be performing surgery at the same volume.

If surgical coaching initiatives are to become more pervasive, it is important to consider how to measure their return on investment. It has not yet been determined how these programs will be funded at scale and whether these costs will be met by the surgeon, institution, payer, or government. For example, coordination for group-based coaching initiatives in MUSIC has been funded by the collaborative’s sponsor, Blue Cross Blue Shield of Michigan. As coaching programs grow outside of the regional collaborative setting, these costs will likely shift to surgeons and institutions. From experience, the cost for a surgical coach to mentor a single surgeon can be in the range of \$3,000 to \$5,000 for 1 to 2 days, where the coach sits with the surgeon during procedures. Given the role and importance of coaching, it would be reasonable to cover the costs of coaching similar to those of other avenues for continued medical education expenses such as conferences and courses.

CONCLUSIONS

Surgical coaching is an emerging professional development intervention with the goal to improve the technical and nontechnical skill of the surgeon, and by doing so, improve patient outcomes (Table 2). The abundance of minimally invasive surgical techniques in urology lends itself well to video-based technical skills peer assessment and coaching. While the evidence base on surgical coaching in urology is limited, urologists need to be aware of this field and consider strategies in their institutions and networks for adoption.

Some of the benefits of a successful surgical coaching program may prove difficult to measure and assign value, such as the way coaching can improve the culture of surgery. If surgical coaching programs demonstrate a positive impact on surgeon well-being and improve patient outcomes, then they may become a regular part of the suite of professional development offerings provided by societies, academic medical centers, and health care systems. While it is difficult to imagine the future state of medical education without a coaching model, surgical coaching can come at a significant cost. Ultimately, coaching programs will need to demonstrate a positive, measurable impact on patient care to prove cost-effective and justify future investments.

DID YOU KNOW?

- Surgical coaching is an emerging field and increasingly recognized as an important part of contemporary clinical practice.
- Coaching exists in many forms and relies on a cooperative partnership between 2 surgeons to further professional development through individualized, collaborative feedback.
- Technological advances and the increasing use of videography in surgery are driving changes on how surgery is evaluated and increasing opportunities for coaching.
- There are many ways in which coaching may add value to surgical practice; the evidence base is growing to properly quantify the impacts of coaching on surgical outcomes.

ACKNOWLEDGMENTS

Some of the work highlighted in this lesson comes from Michigan Urological Surgery Improvement Collaborative (MUSIC), which is funded by Blue Cross Blue Shield of Michigan.

Table 2. A Summary of the Advantages of Surgical Coaching Programs

Surgical coaching
What is it? <ul style="list-style-type: none">• Coaching is a form of development in which an experienced person supports a learner in achieving a specific personal or professional goal by providing training and collaborative guidance.¹• Can occur in person or on video.<ul style="list-style-type: none">◦ Video-based coaching can be concurrent (through live stream) or retroactive (with recordings).
How can it improve my practice? <ul style="list-style-type: none">• Technical<ul style="list-style-type: none">◦ Improve technical skills and efficiency◦ Reduce operative times• Nontechnical<ul style="list-style-type: none">◦ Minimize unproductive hierarchical norms◦ Reduce burnout and promote surgeon well-being◦ Improve ability to deliver feedback to team members◦ Increased sense of community and aligning culture

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Study Questions Volume 42 Lesson 25

1. Coaching is different from other forms of professional development by
 - a. Focusing on passage of advice and counseling
 - b. Emphasizing development of a fund of knowledge
 - c. Utilizing collaborative feedback to progress toward an individual prespecified goal
 - d. Leveraging hierarchy to set boundaries and expectations
2. Surgical coaching programs have had the most documented success in which setting?
 - a. Single-center programs
 - b. Regional collaboratives
 - c. Nationwide initiatives
 - d. Only in academic centers
3. Which aspect of surgical practice has been shown to improve with surgical coaching?
 - a. Surgeon wellness
 - b. Surgical complication rates
 - c. Costs of surgery
 - d. Patient satisfaction
4. Which of the following is an example of a coaching relationship/interaction?
 - a. A resident gives a medical student a chalk talk on the differential for gross hematuria
 - b. An attending meets with a senior resident to discuss the next steps in their career
 - c. Two residents review their notes on open cystectomy to create a plan for an upcoming case
 - d. A senior faculty meets regularly with younger faculty to review videos of their cases and discuss potential adjustments
5. One aspect of urological surgery that lends itself to increased coaching is its
 - a. Abundance of office procedures
 - b. Smaller residency programs
 - c. Increasing use of minimally invasive surgery
 - d. Mix of benign and malignant pathologies

ERRATA

Prostate Cancer Screening in 2022: An Algorithm-based Approach

Volume 42, Lesson 6, Page 54: “When available, a PSAD of 0.15 is the most commonly used cutoff, above which BPH is more likely than prostate cancer. However, clinicians should recognize that PSAD is continuous and PSAD >0.15 does not exclude prostate cancer while a PSAD <0.15 similarly does not confirm malignancy.” has been changed to “When available, a PSAD of 0.15 is the most commonly used cutoff, below which BPH is more likely than prostate cancer. However, clinicians should recognize that PSAD is continuous and PSAD <0.15 does not exclude prostate cancer while a PSAD >0.15 similarly does not confirm malignancy.” The online and PDF versions of Lesson 6 have been updated to reflect this change.

Adjuvant and Early Salvage Therapy Recommendations Following Radical Surgery in Urological Cancers

Volume 42, Lesson 12, Page 124: Question 3 is as follows. The online and PDF versions of Lesson 12 have been updated to reflect this change.

3. You are having a discussion with a multidisciplinary colleague about a mutual patient. The patient is a 67-year-old man with muscle-invasive bladder cancer, clinically localized. Your colleague argues the patient should proceed directly to radical cystectomy because the absolute benefit of neoadjuvant chemotherapy is small and adjuvant chemotherapy trials have proven to have good oncologic efficacy. Your response, based on the AUA Guidelines, should be to
 - a. Agree, citing randomized trial data demonstrating a definite overall survival benefit to adjuvant chemotherapy
 - b. Agree, citing the results of 2 meta-analyses demonstrating an overall survival benefit of 50% with adjuvant chemotherapy
 - c. Disagree, citing randomized trial data demonstrating no overall survival benefit to neoadjuvant chemotherapy
 - d. Disagree, citing 2 meta-analyses composed of underpowered trial data insufficient for demonstrating a definite benefit to adjuvant chemotherapy