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Precut sphincterotomy: Another perspective on efficacy and complications

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INTRODUCTION

Precut sphincterotomy refers to a variety of endoscopic techniques used to gain access to the bile duct and rarely the pancreatic duct during endoscopic retrograde cholangiopancreatography before deep cannulation has been achieved. The term "precut" has been used to describe this technique because an incision is made on the papilla prior to free cannulation and/or wire guidance. Most experts feel that precut sphincterotomy is risky and that it is a technique which should be performed by experts only [1,2]. This topic review will briefly discuss the efficacy of precut sphincterotomy while focusing on the risks and complications. A discussion of the technique is presented separately (see "[Precut sphincterotomy: Another perspective on indications and techniques](#)"). Because of the controversy surrounding this area, this topic is also presented separately from the perspective of another contributor. (See "[Precut \(access\) papillotomy](#)".)

EFFICACY

In most cases precut sphincterotomy is a method of last resort, to be used when all other attempts at cannulation during endoscopic retrograde cholangiopancreatography (ERCP) with standard cannulas, tapered cannulas, papillotomes, and guidewires have failed. There is ample support in the literature to show that precut sphincterotomy is effective at gaining biliary access

[3]. Numerous reports have demonstrated success rates of 65 to 100 percent, either in the first or subsequent attempts [2,4-8]. There is also little doubt that these published series represent the experience of the world's experts; relatively inexperienced endoscopists who rarely use precut techniques are unlikely to publish their data. The cannulation rate among community gastroenterologists after attempted needle-knife papillotomy or other type of precut will probably never be known.

No one disputes the efficacy of precut sphincterotomy at improving the success rate in what would otherwise be failed ERCPs, but at what cost [9]? It is widely held that precut papillotomy raises the complication rate, at least compared with diagnostic ERCP alone, and probably compared with conventional sphincterotomy [2,10-16]. This controversial topic will be explored below.

COMPLICATIONS

Complications of precut sphincterotomy are the same as those encountered with conventional sphincterotomy, namely bleeding, perforation, pancreatitis, and cholangitis [17,18]. Other complications related to the procedure (respiratory arrest, myocardial infarction, stroke, aspiration, etc), but which do not result directly from sphincterotomy, are discussed elsewhere [19]. (See "[Overview of endoscopic retrograde cholangiopancreatography \(ERCP\) in adults](#)".) The crux of the matter is whether these sphincterotomy-related complications occur with increased frequency after precutting.

There appear to be two camps involved in this debate, and both have data to support their views. There are some who feel that precutting techniques are inherently more dangerous than standard sphincterotomy and should thus be left to the experts. Informal surveys of community gastroenterologists have demonstrated that only a few ever use precutting; even some experts avoid the needle knife entirely, while many use it as sparingly as possible. On the other hand, there are a number of authors who have concluded that precutting is effective and safe [6,20-26].

Post-precut complication rates vary widely in the literature, from as low as 2.6 percent to as high as 20 percent [16,20,26,27]. Analysis of risk factors that apply specifically to precut sphincterotomy is difficult because most of the published series have either a low number of precuts (compared with standard sphincterotomy), a very low complication rate, or both. As a general rule, risk factors for complications after precutting are felt to be the same as those of conventional sphincterotomy, namely small duct size, suspected sphincter of Oddi dysfunction (SOD), ampullary tumor, malignant obstructive jaundice, coagulopathy, inexperience of the

operator/small center, difficulty with cannulation, younger patients, and possibly periampullary diverticula [10,13,14,17,28].

With careful review of the literature, two facts emerge:

- Centers that do the most precuts seem to have the lowest complication rates.
- There appears to be no substitute for experience. As an example, many centers in northern Europe and a few in the United States and Britain tend to precut early and often (>10 percent of the time) rather than traumatize the papilla with repeated attempts at cannulation [21,24,29,30]. Precut rates as high as 42 percent have been reported [25]. The complications rates in these centers are rather low, ranging from 2.6 to 12 percent.

There are two explanations for this seeming contradiction. First, centers where precutting is frequently performed generate endoscopists with a high degree of skill at precut papillotomy. Second, early decision to precut may protect the papilla from the trauma of repeated attempts at conventional cannulation, paradoxically lowering the complication rate [5,31] or, at a minimum, not increasing it [32,33]. Late decision to use the needle knife preselects a population of patients in whom the damage may already be done, and thus, the timing of the precut (rather than the precut itself) may have contributed to worse outcomes [34]. It may be that earlier reversion to the needle knife is safer in the long run, assuming adequate training and familiarity with precut techniques [33]. Precutting is not a substitute for skill at biliary cannulation.

SPHINCTER OF ODDI DYSFUNCTION

As noted above, no risk factor specific to precut papillotomy has been clearly identified because studies have been small and/or complication rates are low. However, risks for complication in precutting are generally felt to be the same as those in conventional sphincterotomy [18].

One of these risk factors has been singled out as being particularly hazardous for standard sphincterotomy: suspected sphincter of Oddi dysfunction (SOD). This is especially true in the setting of small or normal-sized bile ducts [10,13,28,35]. One would therefore expect a higher rate of precut complications in patients with SOD. As a result, some authorities specifically admonish against use of the needle knife in patients in whom SOD is suspected [11].

However, this hypothesis was not supported in a study involving 423 patients undergoing sphincterotomy [28]. Although conventional sphincterotomy was associated with more complications in patients with SOD than for other indications (10.8 versus 4.3 percent), the

complication rate after precut in SOD was surprisingly lower than that of standard sphincterotomy (8.6 versus 11.5 percent).

On the other hand, different results were observed in another series in which the overall complication rate was 24 percent after precuts [10]. When done for suspected SOD, the pancreatitis rate alone increased to 35 percent. Furthermore, the frequency of severe complications was substantially higher when precuts were performed for SOD compared with other indications (24 versus 2 percent).

Our own data support early precut sphincterotomy for SOD. From January 1991 to October 1997, we identified 100 consecutive cases of Type II SOD treated with endoscopic biliary sphincterotomies at our institution, with 26 of these being initiated as with needle-knife precut (26 percent) [36]. In the same period, there were 1172 biliary sphincterotomies for all other indications, with about 15 percent of these being initiated as needle-knife precuts. The overall complication rate of the SOD group (comprising two cases of pancreatitis) was not significantly different than that of the "all others" group (2 versus 1 percent) in whom there were seven patients with pancreatitis, two with bleeding, and two with perforations. The slightly increased pancreatitis rate in the SOD group was actually expected to be higher based upon previously published reports [10,28]. We believe that the decision to precut early in this very risky group reduced the expected increase in complications by avoiding numerous failed cannulation attempts.

The management of patients with SOD is discussed in more detail separately [18].

COMPARISON OF TECHNIQUES

There are limited data in which different precutting methods have been directly compared [37-40]. One such report included 103 patients with choledocholithiasis who were randomly assigned to needle-knife precut beginning at the ampullary orifice or so-called "fistulotomy" beginning at an arbitrary point above the orifice [37]. Both methods were equally successful at achieving selective biliary cannulation, but stone extraction was significantly more successful with the traditional needle-knife precut method (98 versus 83 percent). However, the needle-knife precut method was more often associated with hyperamylasemia (18 versus 3 percent) and clinical pancreatitis (8 versus 0 percent). All other complications (bleeding, perforation, cholangitis, and death) were equal in the two groups.

In an observational study including 216 patients who underwent endoscopic retrograde cholangiopancreatography with precut sphincterotomy using either a transpancreatic precut

technique [22] or a conventional needle-knife technique, the rates of both cannulation success and complications did not differ significantly between the two groups [22,38,39].

SUMMARY

- Precut sphincterotomy refers to a variety of endoscopic techniques used to gain access to the bile duct and rarely the pancreatic duct during endoscopic retrograde cholangiopancreatography (ERCP) before deep cannulation has been achieved. The term "precut" has been used to describe this technique because an incision is made on the papilla prior to free cannulation and/or wire guidance. (See ['Introduction'](#) above.)
 - In most cases precut sphincterotomy is a method of last resort, to be used when all other attempts at cannulation during ERCP with standard cannulas, tapered cannulas, papillotomes, and guidewires have failed. Success rates of 65 to 100 percent have been reported for precut sphincterotomy performed by endoscopists experienced in the procedure. (See ['Efficacy'](#) above.)
 - Complications of precut sphincterotomy are the same as those encountered with conventional sphincterotomy, namely bleeding, perforation, pancreatitis, and cholangitis, and they are related to endoscopist experience. Whether complications are more common with precut sphincterotomy compared with conventional sphincterotomy is uncertain. Reported complication rates range from 2.6 percent to as high as 20 percent. (See ['Complications'](#) above.)
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