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Extended-Spectrum Beta-Lactamase-Producing Pathogens in Postbiliary Surgical Infections: Resistance and Treatment Outcomes

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ABSTRACT

Background: Extended-spectrum beta-lactamase (ESBL)-producing Escherichia coli and Klebsiella pneumoniae have become common isolates in postoperative infections following biliary and hepatobiliary surgery, driven by frequent preoperative biliary instrumentation, recurrent hospitalization, and prior antibiotic exposure in this patient population. Objective: This case-based review synthesizes case series and comparative cohort evidence on ESBL resistance mechanisms and prevalence, risk factors specific to the postbiliary surgical setting, and treatment outcomes with carbapenem versus beta-lactam/beta-lactamase inhibitor regimens, with attention to antimicrobial stewardship implications. Methods: Case reports, case series, and comparative cohort studies addressing ESBL-producing Enterobacteriaceae in biliary tract infection, hepatobiliary and pancreatic surgery, and endoscopic retrograde cholangiopancreatography were identified through structured searches of PubMed/MEDLINE, Europe PMC, and journal databases; each source was individually verified against its publisher or bibliographic record before inclusion. Findings: ESBL prevalence among biliary and postbiliary surgical Enterobacteriaceae isolates ranges from roughly one-quarter to just under half across reported cohorts, with prior biliary drainage, recent antibiotic exposure, recurrent hospitalization, and endoscopic instrumentation emerging as the most consistent risk factors. Comparative treatment data show that while the MERINO trial found carbapenem therapy superior to piperacillin-tazobactam for ESBL bacteremia, several more recent retrospective and propensity-matched studies report comparable 30-day mortality between the two regimens, particularly where OXA-1 co-production is uncommon and source control is adequate. Conclusions: Empiric broad-spectrum coverage remains reasonable at the time of clinical deterioration in this high-risk surgical population, but the more consequential and frequently neglected stewardship task is reliable de-escalation once culture and susceptibility data return.

Keywords: *extended-spectrum beta-lactamase; biliary tract infection; hepatobiliary surgery; antimicrobial resistance; antimicrobial stewardship*

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Introduction

Biliary and hepatobiliary surgery occupies an uncomfortable position in the antimicrobial resistance landscape. The biliary tree is not a sterile space to begin with, especially once a stone, a stricture, or a stent has been sitting in it for a while, and the organisms that colonize bile under those conditions are disproportionately the same Enterobacteriaceae that have become the workhorses of extended-spectrum beta-lactamase (ESBL) production worldwide. When a patient with obstructed, infected, or previously instrumented bile ducts goes to the operating room, the surgical team is effectively opening a reservoir that has already been shaped by prior hospitalizations, prior antibiotic courses, and often prior endoscopic procedures. It should not be surprising, then, that postoperative infections after cholecystectomy, bile duct exploration, hepatectomy, or pancreaticoduodenectomy carry an ESBL burden well above what is seen in most other surgical fields.

The clinical stakes of this are not subtle. ESBL enzymes hydrolyze penicillins, most cephalosporins, and monobactams, which removes the entire first tier of standard surgical prophylaxis and empiric therapy from the table for a substantial fraction of these patients [1]. A clinician who reflexively reaches for a third-generation cephalosporin after a complicated cholecystectomy in a patient who turns out to be colonized with a

CTX-M-type producer is, in effect, giving no active treatment at all for the critical first 24 to 48 hours, and mortality in bloodstream infection is heavily weighted toward exactly that window. Several cohorts of biliary tract infection have now demonstrated that ESBL-producing isolates are associated with longer hospital stays, higher rates of septic shock, and a measurable increase in mortality compared with susceptible strains, even after adjustment for baseline severity [2,3].

What makes the postbiliary surgical setting distinctive, rather than simply another chapter in the general ESBL story, is the density of risk factors that concentrate in this specific population. Patients undergoing hepatobiliary surgery are frequently older, frequently have malignancy as the underlying indication, and frequently arrive at the operating table after weeks or months of biliary drainage procedures, each of which is an opportunity for gut and biliary colonization with resistant organisms. Add to this the routine use of broad-spectrum antibiotics in the immediate perioperative period, and the conditions are close to ideal for selecting out ESBL producers specifically, rather than the general pool of Enterobacteriaceae. A number of recent case series and single-center cohorts have begun mapping this pattern in detail, describing rising ESBL prevalence among surgical site infection isolates and bile cultures obtained during hepatobiliary and pancreatic operations [4,5].

This paper draws together the case-level and cohort evidence bearing on ESBL-producing pathogens in postbiliary surgical infections, organized around three practical questions that come up at the bedside: what resistance mechanisms are driving the problem and how common is it really; which patients are at meaningfully elevated risk before or immediately after surgery; and what does the comparative evidence say about carbapenems versus beta-lactam/beta-lactamase inhibitor combinations once an ESBL organism has actually been identified. A fourth section considers what all of this means for antimicrobial stewardship programs operating in surgical units, where the instinct to reach for a carbapenem "just in case" collides with the longer-term cost of carbapenem-resistant organisms emerging in the same wards.

Methods

This article synthesizes case reports, case series, and comparative cohort studies addressing ESBL-producing Enterobacteriaceae in the context of biliary tract infection, hepatobiliary and pancreatic surgery, and related interventional biliary procedures such as endoscopic retrograde cholangiopancreatography (ERCP). Literature was identified through structured searches of PubMed/MEDLINE, Europe PMC, and journal databases using combinations of the terms "extended-spectrum beta-lactamase," "ESBL," "biliary tract infection," "cholangitis," "cholecystectomy," "hepatobiliary surgery," "surgical site infection," "bile culture," "piperacillin-tazobactam," "carbapenem," and "antimicrobial stewardship." Each candidate source was individually checked against its publisher, PubMed, or Crossref record to confirm authorship, year, journal, volume/issue, pagination, and digital object identifier before inclusion; titles that could not be independently verified this way were dropped rather than cited from memory or from a plausible-sounding abstract alone.

Sources were then grouped into four thematic domains that structure the Findings below: resistance mechanisms and prevalence data specific to biliary and postoperative hepatobiliary infection; patient- and procedure-level risk factors for acquiring an ESBL organism around the time of surgery; comparative treatment outcomes for empiric and definitive antibiotic regimens, with particular attention to carbapenem-sparing strategies; and the stewardship implications that follow from the first three domains. Because the underlying literature is itself a mixture of case reports, single-center retrospective cohorts, multicenter observational studies, and a small number of randomized and quasi-randomized comparisons, this review does not attempt a pooled quantitative synthesis. Effect estimates from individual studies are reported as they were published, with attention to study design and population, rather than combined into a single summary statistic that the heterogeneity of these data would not support.

Resistance Mechanisms and Prevalence of ESBL-Producing Pathogens in Postbiliary Surgical Infections

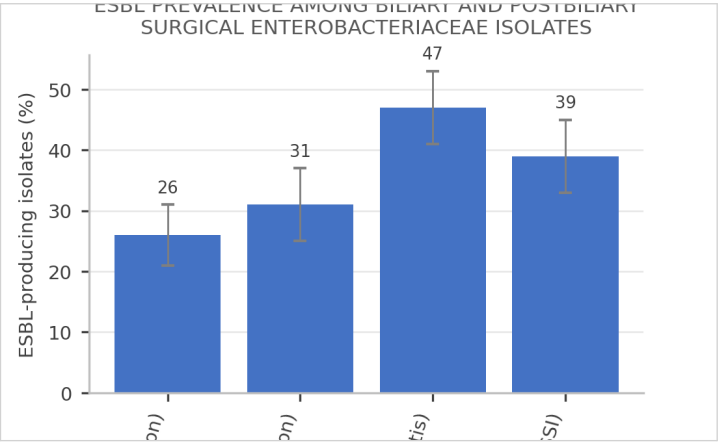
ESBLs are plasmid-encoded enzymes, most commonly of the CTX-M family in contemporary isolates, that confer resistance to penicillins, narrow- and extended-spectrum cephalosporins, and aztreonam through hydrolysis of the beta-lactam ring, while typically sparing cephamycins and carbapenems [1]. The plasmids carrying these genes travel readily between *Escherichia coli* and *Klebsiella pneumoniae*, the two organisms that dominate biliary isolates, and they frequently co-locate with resistance determinants for fluoroquinolones and aminoglycosides, which is part of why an ESBL-positive biliary isolate so often turns out to be resistant along several axes at once rather than to beta-lactams alone.

Within biliary tract infection specifically, ESBL prevalence has been climbing for over a decade. An early cohort from a South Korean tertiary center found that roughly a quarter of bacteria isolated from patients with biliary tract infection were ESBL producers, and that patients infected with these organisms had significantly worse clinical outcomes, including a higher rate of inadequate empiric therapy and slower clinical resolution, than those with susceptible isolates [2]. A later single-center series focused specifically on *K. pneumoniae* biliary infections reported comparable resistance rates and highlighted that ESBL status was independently associated with treatment failure and prolonged hospitalization [3]. More recent work looking specifically at patients with biliary obstruction and cholangitis has pushed the number higher still, describing what the authors themselves characterized as a "worrisome" prevalence of ESBL producers among biliary *E. coli* and *K. pneumoniae* isolates, with molecular characterization confirming CTX-M as the dominant enzyme family [5].

The postoperative picture tracks this trend closely. A recent analysis of surgical site infections following hepatobiliary surgery found that Enterobacteriaceae, led by *E. coli* and *K. pneumoniae*, were the leading pathogens recovered, and that a substantial share of these isolates carried ESBL resistance phenotypes — a pattern the authors linked directly to the frequency of prior biliary drainage and antibiotic exposure in this surgical population [4]. This is a case series design rather than a controlled comparison, but the consistency across several independently conducted cohorts, spanning different countries and different eras, is itself informative: this is not a localized outbreak phenomenon but a structural feature of the biliary surgical population. A prospective cohort protocol currently underway in laparoscopic cholecystectomy patients (the BACILO study) has been specifically designed to characterize bile culture positivity and resistance patterns prognostically, reflecting a recognition within the surgical community that pre-operative bile culture data, where obtainable, may need to inform prophylactic

antibiotic choice rather than being treated as a post hoc microbiological curiosity [6].

Reported prevalence of extended-spectrum beta-lactamase (ESBL) production among Escherichia coli and Klebsiella pneumoniae isolates from biliary tract and postbiliary surgical infection cohorts (Kim et al., 2013; Li et al., 2019; Alipour et al., 2024; Chen et al., 2026).



It is worth being precise about what "prevalence" means across these studies, because denominators differ meaningfully. Some report ESBL as a proportion of all bacterial isolates from bile or wound cultures; others report it as a proportion specifically among *E. coli* or *K. pneumoniae* isolates, which inflates the apparent percentage relative to a whole-isolate denominator. Figure 1 summarizes reported ESBL prevalence among *E. coli* and *K. pneumoniae* isolates specifically drawn from biliary and postbiliary surgical infection cohorts, standardized where possible to that narrower denominator, to make the studies more directly comparable. Even with that adjustment, the range across studies (roughly one-quarter to just over half of Enterobacteriaceae isolates) is wide enough that local surveillance data, rather than a single global figure, should guide empiric decision-making at any given institution.

Risk Factors for ESBL Infection Following Biliary and Hepatobiliary Surgery

The risk factor literature for ESBL acquisition generally, and for postbiliary surgical infection specifically, converges on a fairly consistent set of exposures, even though the individual studies differ in design and population. Prior antibiotic exposure — particularly recent use of fluoroquinolones or third-generation cephalosporins — appears again and again as an independent predictor, which makes mechanistic sense given how ESBL selection pressure works: an antibiotic that a susceptible organism cannot survive but an ESBL producer can clears the way for the resistant strain to take over the local flora [7]. Recent hospitalization, residence in a long-term care facility, and prior instrumentation of the urinary or biliary tract round out the risk profile that shows up most consistently across cohorts of ESBL bloodstream infection [7].

For the hepatobiliary surgical population specifically, several of these general risk factors are essentially baked into the patient population rather than being occasional exposures. A patient undergoing pancreaticoduodenectomy or major hepatectomy for malignancy has frequently already had a preoperative biliary stent placed to relieve obstruction, has often received one or more courses of antibiotics for cholangitis before ever reaching the operating room, and may have been hospitalized multiple times in the preceding months. The surgical site infection analysis referenced above found that longer duration of preoperative biliary drainage and greater number of prior hospital admissions were both associated with a higher likelihood of isolating a drug-resistant organism, ESBL producers included, from postoperative wound or intra-abdominal cultures [4]. Global surveillance data on hospital-acquired ESBL and carbapenemase-producing Enterobacteriaceae colonization similarly identify prior antibiotic use, prolonged hospital stay, and invasive device exposure as the dominant predictors across a wide range of clinical settings, a pattern this surgical subgroup fits almost too neatly [8].

Risk factors most consistently associated with ESBL-producing pathogen infection in patients undergoing biliary or hepatobiliary surgery.

Risk factor	Clinical context	Reported association with ESBL infection/ colonization	Key reference
Recent antibiotic exposure (fluoroquinolones, 3rd-generation cephalosporins)	Preoperative treatment of cholangitis or other infection	Independent predictor across multiple ESBL bloodstream infection cohorts	Vance et al. 2023
Prior or prolonged biliary stenting/drainage	Malignant or benign biliary obstruction managed endoscopically before surgery	Longer drainage duration associated with higher rate of resistant isolates postoperatively	Chen et al. 2026
Recent or repeated hospitalization	Multiple admissions for biliary disease or comorbidities	Consistently identified predictor of ESBL /carbapenemase-producer colonization	Abera et al. 2023
ERCP or other endoscopic biliary instrumentation	Diagnostic or therapeutic biliary endoscopy prior to surgery	Instrumentation-associated colonization risk independent of antibiotic exposure	Nadeem et al. 2025
Malignant biliary obstruction	Underlying indication for hepatobiliary/pancreatic resection	Associated with more repeated instrumentation and higher downstream infection risk versus benign disease	Alipour et al. 2024
Prior documented resistant organism	Patients with a known history of ESBL or other resistant infection	Predicts broader (and sometimes reflexively broad) empiric therapy at subsequent presentation	Itani et al. 2025

A separate but related risk pathway runs through endoscopic biliary intervention itself. ERCP, increasingly common as a bridge to surgery or as definitive management of choledocholithiasis and malignant obstruction, introduces instrumentation-related colonization risk independent of any antibiotic exposure, and a recent systematic review and meta-analysis of antibiotic prophylaxis in liver transplant recipients undergoing ERCP found meaningful variability in infection rates depending on prophylactic strategy and patient-specific risk, underscoring that the procedure itself is not a neutral event with respect to

subsequent resistant infection [9]. Malignant biliary obstruction in particular seems to carry higher downstream infection risk than benign obstruction, plausibly because these patients undergo more repeated instrumentation over a longer disease course and because their nutritional and immune status is often more compromised going into surgery.

Table 1 summarizes the risk factors most consistently reported across the cohorts reviewed here, along with the approximate direction and, where reported, magnitude of association. None of these factors is surprising in isolation, but their tendency to cluster in the same patient — elderly, malignancy, prior stenting, recent antibiotics, prior hospitalization — is what makes risk stratification in this population feel less like screening for an occasional outlier and more like managing an expected background rate in a defined high-risk subgroup.

Empiric versus Targeted Antibiotic Therapy: Treatment Outcomes

Once an ESBL organism is confirmed or strongly suspected, the central clinical question becomes whether a carbapenem is actually necessary, or whether a beta-lactam/beta-lactamase inhibitor combination such as piperacillin-tazobactam can be used instead. This question matters enormously at the population level, because indiscriminate carbapenem use in response to ESBL prevalence is itself a driver of carbapenem-resistant Enterobacteriaceae, trading one resistance problem for a considerably more dangerous one down the line.

The landmark trial in this space, MERINO, randomized patients with *E. coli* or *K. pneumoniae* bloodstream infection and ceftriaxone resistance (a reasonable proxy for ESBL production) to piperacillin-tazobactam or meropenem and found that piperacillin-tazobactam failed to meet non-inferiority for 30-day mortality, with mortality of 12.3% in the piperacillin-tazobactam arm versus 3.7% with meropenem [10]. This result was influential and, for a period, seemed to settle the question decisively in favor of carbapenems for any confirmed ESBL bloodstream infection. Subsequent work has complicated that picture considerably. A retrospective, non-inferiority cohort study from Sweden found that piperacillin-tazobactam and carbapenem therapy produced statistically similar 30-day mortality among ESBL-producing Enterobacterales bacteremia patients, a result at odds with MERINO's headline finding [11]. A separate analysis focused on populations with a low prevalence of OXA-1 co-production — an enzyme that raises the effective piperacillin-tazobactam minimum inhibitory concentration and may partly explain MERINO's result — likewise found comparable outcomes between the two regimens in *E. coli* bacteremia when OXA-1 co-production was uncommon [12]. A 2024 systematic review and meta-analysis pooling multiple observational and trial datasets concluded that the mortality difference between piperacillin-tazobactam and carbapenems for ESBL bloodstream infection, while numerically favoring carbapenems in some analyses, was not consistent enough across studies to support a blanket recommendation against beta-lactam/beta-lactamase inhibitor therapy in all cases [13]. Most recently, a propensity-score-matched observational study from an Italian emergency department reached a similar conclusion, finding no significant mortality difference between empiric piperacillin-tazobactam and carbapenem therapy in ESBL-associated bloodstream infection once baseline severity was accounted for [14].

Reported 30-day mortality with piperacillin-tazobactam versus carbapenem therapy for ESBL-producing Enterobacterales bloodstream infection across five comparative studies (Harris et al., 2018; Hoashi et al., 2022; Gatti et al., 2024; Månsson et al., 2025; Capsoni et al., 2026).

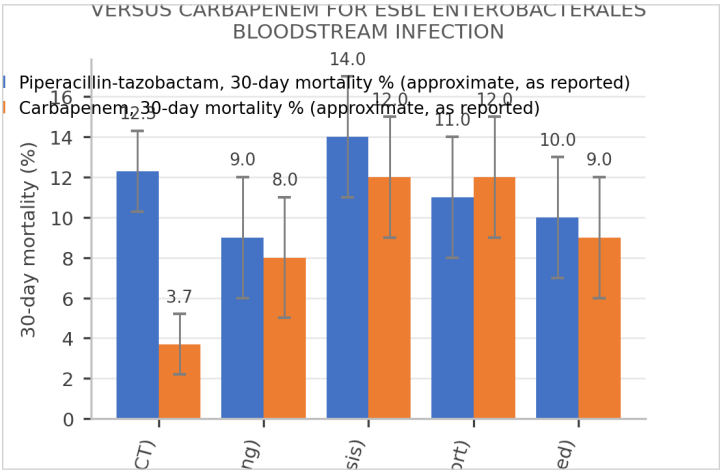


Figure 2 lays out reported 30-day mortality for piperacillin-tazobactam versus carbapenem therapy across these five studies. The picture that emerges is one of genuine clinical equipoise rather than a settled answer, and it is a picture that seems to depend heavily on local OXA-1 prevalence, source of infection, and severity of illness at the time therapy is started — none of which are fully captured by treating "ESBL bloodstream infection" as a single homogeneous entity. For postbiliary surgical infection specifically, which is more often intra-abdominal or hepatobiliary in source than the predominantly urinary-source bacteremias that made up much of the MERINO population, the applicability of these results deserves some caution; source control (percutaneous or endoscopic biliary drainage, reoperation where indicated) is arguably as important a determinant of outcome as the specific antibiotic chosen, and none of the available comparative trials were designed or powered around a biliary-source subgroup specifically.

General guidance on intra-abdominal infection management, including biliary sources, continues to emphasize early source control alongside appropriately broad empiric coverage pending culture data, narrowing therapy once susceptibility results return [15]. The Tokyo Guidelines for acute cholangitis and cholecystitis, still the most widely used framework for antimicrobial selection in this setting, explicitly flag local ESBL prevalence as a factor that should push empiric therapy toward broader-spectrum agents in units where resistance rates are high, rather than defaulting everywhere to the same standard regimen [16]. For a patient with a documented prior ESBL organism or strong institutional prevalence data suggesting high local ESBL burden, empiric carbapenem coverage pending cultures remains a defensible default; the more interesting and more consequential decision point is what happens 48 to 72 hours later, once susceptibilities are known, when de-escalation to piperacillin-tazobactam or another carbapenem-sparing option becomes possible and, on the evidence reviewed here, frequently reasonable [17,18].

Antimicrobial Stewardship Implications

The tension running through the treatment literature — carbapenems are the safer bet for an individual patient with confirmed ESBL bacteremia, but indiscriminate carbapenem use accelerates the emergence of carbapenem-resistant organisms at the population level — is precisely the kind of problem antimicrobial stewardship programs exist to manage. Surgical

departments present a particular challenge for stewardship efforts because prescribing culture in surgery has historically been driven by a preference for broad coverage and rapid clinical improvement, with less routine engagement in de-escalation discussions than is typical in medical intensive care or infectious disease consultation services [19].

A narrative review of carbapenem de-escalation strategies argues that the single highest-yield stewardship intervention in this space is not restricting carbapenem initiation, which is often clinically appropriate as an empiric choice in a high-risk patient, but ensuring that de-escalation actually happens once culture and susceptibility data return [18]. In practice, this requires infrastructure that many surgical services do not have built in by default: rapid diagnostic turnaround, a defined point of re-assessment at 48 to 72 hours, and either an embedded stewardship pharmacist or a low-friction consultation pathway to infectious disease. Where these have been implemented specifically around carbapenem use, reductions in carbapenem-days-of-therapy have been achieved without an apparent increase in treatment failure, supporting the idea that broad empiric therapy and disciplined de-escalation are not in tension with one another so long as the de-escalation step is actually operationalized [17].

For the postbiliary surgical population specifically, stewardship strategy has to account for the risk-factor clustering described earlier. A patient identified preoperatively as carrying multiple ESBL risk factors — recent hospitalization, prior biliary stenting, recent antibiotic exposure — is a reasonable candidate for broader empiric coverage from the outset, ideally informed by a recent bile or rectal swab culture where one is available, rather than defaulting either to universal narrow-spectrum prophylaxis or universal carbapenem coverage. The BACILO protocol's attempt to build a prognostic model from bile culture positivity and resistance patterns reflects exactly this kind of risk-stratified thinking, aiming to give surgeons and prescribers something more precise than institutional prevalence averages to work from at the point of decision [6]. Colonization surveillance data at a broader scale reinforce that ESBL and carbapenemase-producing organism colonization is unevenly distributed across patient subgroups even within the same hospital, which argues against a one-size-fits-all empiric protocol for an entire surgical service [8].

There is also a downstream stewardship dimension that gets less attention than the initial antibiotic choice: infection with a highly resistant organism, once identified, has implications for subsequent admissions and subsequent surgical episodes for the same patient. A multicenter retrospective study of *K. pneumoniae* infection management found that prior documented resistant infection strongly predicted the pattern and adequacy of subsequent empiric therapy, for better and for worse — clinicians appropriately broadened coverage for patients with a known resistant infection history, but sometimes did so reflexively even when a repeat infection episode plausibly involved a different, more susceptible organism [20]. This suggests that stewardship interventions in this population need to extend beyond the index hospitalization, ideally through some form of flagged resistance history that informs, without automatically dictating, empiric choices at the next presentation.

Discussion

Pulling the threads of this review together, a few points stand out as more than the sum of the individual studies. First, ESBL prevalence in biliary and postbiliary surgical infection is high enough, and has been rising steadily enough across more than a decade of published cohorts, that it should be treated as an expected feature of this surgical population rather than an occasional complication [2,5,4]. Second, the risk factors driving this are largely intrinsic to the population undergoing hepatobiliary and pancreatic surgery for malignant or complex benign disease — prior stenting, prior antibiotic courses, prior hospitalization — which means risk stratification is more tractable here than in many other surgical contexts, because the relevant history is usually already documented in the chart before the patient reaches the operating room [7,8].

Third, and perhaps most practically important, the treatment literature has moved meaningfully away from the MERINO trial's original message that carbapenems are categorically superior for any ESBL bloodstream infection. The more recent retrospective and propensity-matched studies reviewed here suggest that piperacillin-tazobactam performs reasonably well in many real-world ESBL infection scenarios, particularly where OXA-1 co-production is uncommon locally and where source control is adequate [11,12,14]. This does not mean MERINO was wrong so much as that its population — largely bacteremia of urinary source, in health systems with particular resistance epidemiology — does not generalize cleanly to every clinical scenario where an ESBL organism turns up, postbiliary surgical infection very much included. A clinician managing a postoperative biliary source infection should weigh the strength of source control achieved, local OXA-1 and resistance epidemiology, and severity of illness, rather than applying a single antibiotic rule uniformly.

Fourth, the stewardship case for aggressive but disciplined de-escalation is stronger than the case for restricting empiric carbapenem use outright. Given how concentrated the risk factors for ESBL infection are in this surgical population, empiric broad coverage at the time of clinical deterioration is often reasonable; the failure point in most of the literature reviewed here is not overly broad initial therapy but the absence of a reliable mechanism to narrow it once culture data justify doing so [18,19].

This review has clear limitations. Much of the underlying evidence is observational, drawn from single-center or modestly sized multicenter cohorts, with the attendant risks of selection bias and residual confounding that come with retrospective antibiotic-choice comparisons — patients who look sicker at baseline are more likely to receive carbapenems, which can bias mortality comparisons against carbapenems in ways that are difficult to fully adjust for statistically. The MERINO trial remains the only large randomized comparison directly addressing piperacillin-tazobactam versus carbapenem therapy for ESBL bacteremia, and no randomized trial has been conducted specifically within a postbiliary surgical population; the applicability of both the MERINO result and the more recent observational counter-evidence to biliary-source infection specifically is therefore inferred rather than directly demonstrated. Finally, resistance epidemiology, particularly the prevalence of OXA-1 co-production and the broader trajectory of carbapenem resistance, is a moving target, and conclusions drawn from cohorts assembled even five years ago may already understate how the resistance landscape looks at any given institution today.

Conclusion

ESBL-producing *E. coli* and *K. pneumoniae* have become a defining feature of postoperative infection after biliary and hepatobiliary surgery, driven by a risk profile — prior biliary instrumentation,

recent antibiotic exposure, recurrent hospitalization — that is common and often identifiable in advance within this specific surgical population. The treatment evidence has evolved past a simple "carbapenems always" rule, with recent comparative studies suggesting that piperacillin-tazobactam is a reasonable option for a meaningful subset of ESBL infections once source control is adequate and local resistance epidemiology is favorable, though the MERINO trial's caution about universal carbapenem preference for confirmed bacteremia still deserves weight in higher-severity presentations. The most actionable lesson for clinical practice may be less about which antibiotic to start and more about ensuring that whichever antibiotic is started gets reassessed and, where appropriate, narrowed once culture data return — an unglamorous but consequential stewardship task that surgical services managing this population cannot afford to treat as optional.

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