CD Summary

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VIBRIOSIS IN OREGON

What do these people have in common: a businessman at happy hour in downtown Portland; a family at Sunday brunch at a local restaurant; a reveler celebrating in the French Quarter; and a 7-year-old with chronic ear infections splashing in the Pacific Ocean? The answer is…

VIBRIO

Vibrio species are small, Gram-negative rods found in aquatic environments. Twelve species have been isolated from clinical specimens.[1] With the exception of *Vibrio cholerae,* for which humans are the primary reservoir, vibrios are usually acquired by eating shellfish, especially raw oysters. This *CD Summary* focuses on the *Vibrio* sp. most frequently reported in Oregon and the role of reporting in the identification and closure of risky shellfish harvesting areas.

HISTORY

Vibrios have a rich history. *Vibrio cholerae* serogroup O1 has been the cause of 7 known pandemics of diarrheal misery and death. *V. cholerae* wreaks its havoc via cholera toxin, which activates adenylate cyclase in the intestinal mucosa, leading to a profuse, secretory, watery diarrhea.[2]

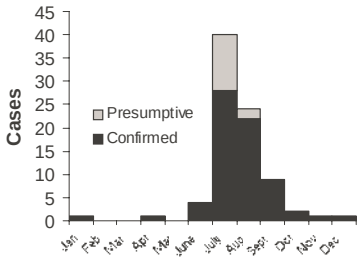
Oregon commenced active surveillance for culture-confirmed infections by any *Vibrio* species in 1997, and we have seen some nontoxigenic *Vibrio cholerae*. But the real *Vibrio* story in our state lies with *V. parahaemolyticus*.

V. PARAHAEMOLYTICUS

Thermostable direct hemolysin (tdh)-producing *V. parahaemolyticus* usually causes a relatively severe, but self-limited gastroenteritis characterized by watery diarrhea and abdominal cramps. Some cases experience fever, nausea, vomiting, headache and bloody or mucoid diarrhea. Self-reported duration of illness for Oregon cases ranged from 2–18 days (median, 7). The usual incubation period is 4–30 hours.[3] The most susceptible are those with decreased stomach acidity, diabetes, peptic ulcers, immunocompromising conditions or liver disease. Wound infections by *V. parahaemolyticus* have been noted; bacteremia is rare.

98 cases of vibriosis have been reported in Oregon since 1997, and 82% were caused by *V. parahaemolyticus*. Seventy-one percent of *V. parahaemolyticus* cases were male, and 69% were 30–59 years of age. Most cases occurred in July and August (Figure). For cases for whom we have an exposure history, 80% had consumed raw oysters in the 7 days before illness. During 1997–2006, 7 *V. parahaemolyticus* outbreaks were logged in Oregon (Table).

***V. parahaemolyticus* Infections by Month of Onset, Oregon, 1997–2006.**



V. parahaemolyticus is ubiquitous in seawater, but densities of the organism increase as water temperature increases above 15°C. Water temperature accounts for both the geographical and seasonal distribution of *V. parahaemolyticus*. The concentrations of the bacteria in oysters can be 100 times that in surrounding water.[4]

During 1973–1998 CDC recorded 40 *parahaemolyticus* outbreaks comprising 1,064 cases. The modal month of incidence was July. Thirty percent of these outbreaks were reported in 1997 and 1998—both "El Niño" years, when Pacific water temperatures were particularly warm.[5] An outbreak in 1997 involved >200 people from 7 states and Canada; it was associated with consuming raw or undercooked shellfish harvested from British Columbia, California, Oregon and Washington.[6] During the summer of 2004, an outbreak of V. *parahaemolyticus* gastroenteritis was associated with oysters harvested in Alaska—the northernmost source of oysters documented to transmit the infection.[7]

FDA PREVENTION EFFORTS

The National Shellfish Sanitation Program (NSSP), administered by the states and FDA, has established requirements for monitoring shellfish-harvesting

***V. parahaemolyticus* Outbreaks, Oregon, 1997–2006.**

Year	Outbreaks	Outbreak Cases	Implicated Food
1997	1	12	Raw oysters
1998	1	2	Raw oysters
2000	1	2	Raw oysters
2001	1	3	Raw oysters
2004	2	5	Raw oysters "BBQ" oysters
2006	1	14	Oysters

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areas. A shellfish-harvesting area will be closed if total *V. parahaemolyticus* counts exceed 5,000 colony-forming units (CFU) per gram of shellfish or if ≥5 pathogenic (tdh+) CFU per 0.1 gram are detected.[8] In addition, if 2 confirmed illnesses are linked to the same harvest area in the same harvest period, the area will be closed to harvest. Shellfish are linked to harvesting areas through the harvest tags kept by restaurants. According to NSSP guidelines, any growing area associated with a previous closure in the past 5 years should sample regularly. Oregon, Washington and British Columbia monitor shellfish beds beyond the minimum requirements and increase sampling when coastal temperatures rise. Despite these control measures, cases continue to occur; the human bioassay may be more sensitive than the sampling scheme.

OTHER VIBRIOS

Vibrio vulnificus, prevalent in Gulf Coast waters, causes the most serious vibriosis in the U.S.—wound infections and sepsis in immunocompromised individuals, alcoholics, those with chronic liver disease and hemochromatosis. Septic patients often have distinctive bullous skin lesions. Other recognized pathogens include nontoxigenic *V. cholerae*, *V. alginolyticus*, *V. mimicus*, *V. hollisae* and *V. fluvialis.*

LABORATORY DIAGNOSIS

Use of the selective thiosulfate-citrate-bile salt-sucrose (TCBS) medium is recommended for stool cultures. In most laboratories, TCBS is not routinely used so a special request for *Vibrio* isolation is needed. Non-selective culture media like blood agar can grow *Vibrio* species from wounds, and the organism can also be recovered from commercial blood-culture media.

TREATMENT

Rehydration is the mainstay of treatment for severe diarrheal disease. Antibiotic treatment for *V. parahaemolyticus* gastroenteritis is not known to shorten the course. However, when antibiotics are necessary, doxycycline and fluoroquinolones are suggested. For *V. vulnificus* and *V. alginolyticus* infections, a combination of doxycycline and ceftazidime is recommended.[9] Rapid administration of antibiotics is vital in *V. vulnificus* infections.

CONCLUSION

With the onset of warmer months and warmer coastal waters, expect *Vibrio* infections to resurface. Ask the raw oyster question when you see adult patients with a diarrheal illness. When ordering cultures (and we do recommend them), be sure to ask specifically for the detection of *Vibrio*, so that specimens will be plated on TCBS medium. Prompt reporting to the local health department will start the process of tracing the product and will facilitate identification of high-risk harvest areas. Advise patients, particularly the immunosuppressed and those with liver disease, to eschew the consumption of raw oysters. Even if Vibrios are absent, raw oysters can make you sick—think norovirus.

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