

Challenge GS 092-2

August 2009

Gram: Wound- *Streptococcus* species

HISTORY

The sample was sent as a gram smear from a wound of a 75 year old patient with leg cellulitis.

Only participant laboratories processed the sample. Category A, B, C and C1 laboratories participated in this challenge.

CMPT QA

The smear, reviewed at CMPT, presented 4+ (>10/oif) neutrophils, 3+ (11-50/oif) gram positive cocci (see Figure 1). The challenge was verified by internal quality control, which indicated 99% accuracy based on MIL-STD-105E¹

SURVEY RESULTS

Reference Labs:

cells - 10 labs reported 4+, >25/oif neutrophils, 5 labs did not participate (snnp)

bacteria - 10 labs reported 3+, 4+, >25/oif gram positive cocci +/- suggestive of *Streptococcus* sp.

Consensus was achieved by the reference labs thus the sample was considered for grading:

Cell component (see Table 1)

The majority of the labs (95%) received a grade of 4 for the cell component, reporting neutrophils between >10 to >30/oif or 2+ to 4+.

Neither red blood cells, nor epithelial cells were present in the sample, however some labs reported the presence of red blood cells, and two laboratories reported the presence of epithelial cells in addition to neutrophils. One lab also

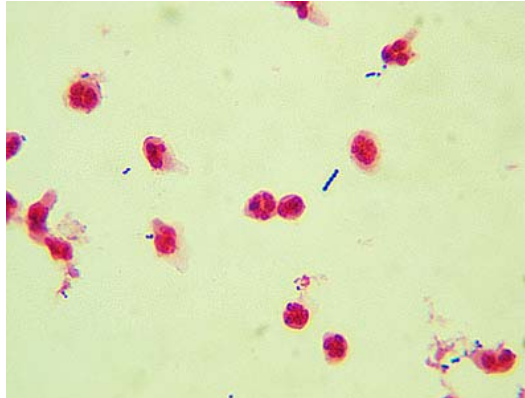


Figure 1: GS092-2 gram smear. The sample shows neutrophils and gram-positive cocci in pairs and chains.

reported white blood cells but did not specify type. None of these labs were downgraded.

One lab did not submit a report and was given a grade of zero.

Bacterial component (see table 2)

Overall, 95% of the laboratories (96% of A, 94% of B, 86% of C and 100% of C1 laboratories) successfully identified gram positive cocci in pairs and chains in the smear. Many added the comment "suggestive of *Streptococcus/Enterococcus* species". These laboratories received a grade of 4.

One laboratory reported gram positive cocci and gram positive diplococci and was given a grade of 3.

One laboratory reported gram negative bacilli and was graded zero. Another laboratory failed to report bacterial morphology and gram stain reaction and was given a grade of zero.

Grading

Maximum grade: 8 (4 points each for the cell and bacterial component).

- Reporting epithelial cells, red blood cells, and white blood cells instead of neutrophils was not downgraded.
- Reporting only diplococci or pairs, but not mentioning chains was downgraded to 3.
- Reporting gram-negative microorganisms was downgraded to zero because of the clinical implications of such report.
- Not reporting bacterial morphology and gram stain reaction was downgraded to zero.
- Not reporting is always considered unacceptable and is graded zero.

Table -1: Reported results for GS092-2 smear – Cell component -

Reported results (cell component)	Total	%	Grade
2+, 3+, 4+, >10, >25, 30/oif neutrophils +/- 2+ RBC's	76	95.0	4
4+ WBC's	1	1.3	4
3+, 4+ neutrophils, 1+ epithelial cells	2	2.5	4
no report	1	1.3	0
Total	80	100.0	

snnp*: sample not normally processed. Laboratories did not enroll in the program

Table-2: Reported results for GS092-2 smear – Bacterial component -

Reported results (bacterial component)	A	B	C	C1	Total	%	Grade
2+, 3+, 4+, >25-50/oif gram positive cocci, +/- pairs, chains, +/- suggestive of <i>Streptococcus/Enterococcus</i> sp.	51	16	6	3	76	95.0	4
3+ gram positive cocci, 3+ gram positive diplococci	1				1	1.3	3
3+ gram negative bacilli		1			1	1.3	0
3+ pairs, chains			1		1	1.3	0
no report	1				1	1.3	0
Total	53	17	7	3	80	100.0	

The laboratory that did not submit a report was given a grade of zero.

COMMENTS ON RESULTS

Some laboratories reported the presence of gram negative bacilli in the sample. This could have been the result of excessive decolorizing.

CLINICAL SIGNIFICANCE

Cellulitis is an acute, spreading infection of the skin that extends deeper than erysipelas and involves the subcutaneous tissues.

Previous trauma or an underlying skin lesion predisposes the development of cellulitis. Cellulitis of the lower extremities in older patients may be complicated by thrombophlebitis.² In one study of hospitalized, elderly patients with cellulitis, a majority had multiple possible predisposing factors. The most common predisposing factors are diabetes mellitus, history of cellulitis, edema, peripheral vascular disease, and skin changes suggestive of tinea pedis. A significant number of patients were clinically noted to have dry skin.³

Polymorphonuclear leucocytosis is usually present regardless of the bacterial etiology. Needle aspirates from areas of cellulitis provide the best information on the most likely pathogens. Gram-positive bacteria (mainly *S. aureus*, group A streptococci, group B streptococci, viridians streptococci, and *Enterococcus faecalis*) represented 79% of the isolates.²

Non-group A β -hemolytic streptococci (groups C, G, and B) have been involved in cellulitis in the

lower extremities of patients whose saphenous veins have been removed for coronary bypass surgery⁴. Group B and G streptococci have also been involved in recurrent episodes of cellulitis in patients with lower-extremity lymphedema secondary to radical pelvic surgery, radiation therapy, or neoplastic involvement of pelvic lymph nodes⁵.

The committee recommends that all Proficiency Testing samples should be processed as routine samples even when there is a staff shortage or high workload.

REFERENCES

1. Farnum NR. 1994. Chapter 11. Acceptance sampling. P 305-361. Modern Statistical Quality Control and Improvement. Duxbury Press, Belmont California
2. Swartz MN, Pasternack MS. Cellulitis and subcutaneous tissue infections. In: Mandel G, Douglas R, Bennett J., ed. *Principles and Practice of Infectious Diseases*. Vol 1. 6th ed. Churchill Livingstone: Elsevier; 2005:1172.
3. Koutkia P, Mylonakis E, Boyce J Cellulitis: evaluation of possible predisposing factors in hospital patients. *Diagnostic Microbiology and Infectious Disease*. 1999;34:325-327
4. Baddour LM, Bisno AL. Recurrent cellulitis after saphenous venectomy for coronary bypass surgery. *Ann Intern Med*. 1982;97:493-496.