Supplement 1 ISREC-classification

Grade A	Anastomotic leakage requiring no active therapeutic intervention
Grade B	Anastomotic leakage requiring active therapeutic intervention but manageable without re-laparotomy
Grade C	Anastomotic leakage requiring re-laparotomy

The international Study Group of Rectal Cancer severity grading of anastomotic leakage [10]

Supplement 2 Clavien-Dindo classification

Grade I	Any deviation from the normal postoperative course without the need for pharmacological treatment or surgical, endoscopic and radiological interventions Allowed therapeutic regimens are: drugs as antiemetics, antipyretics, analgesics, diuretics, electrolytes and physiotherapy. This grade also includes wound infections opened at the bedside
Grade II	Requiring pharmacological treatment with drugs other than such allowed for grade I complications. Blood transfusions and total parenteral nutrition are also included.
Grade IIIa	Requiring surgical, endoscopic or radiological intervention not under general anesthesia
Grade IIIb	Requiring surgical, endoscopic or radiological intervention under general anesthesia
Grade IVa	Life-threatening complication (including CNS complications)* requiring IC/ICU-management, with single organ dysfunction (including dialysis)
Grade IVb	Life-threatening complication (including CNS complications)* requiring IC/ICU management, with multiorgan dysfunction
Grade V	Death of a patient

*Brain hemorrhage, ischemic stroke, subarachnoidal bleeding, but excluding transient ischemic attacks.

CNS = central nervous system; IC = intermediate care; ICU = intensive care unit

Clavien-Dindo classification for surgical complications [14]

Amsterdam UMC University Medical Centers Maastricht UMC+

The definition of colorectal anastomotic leakage

Welcome to this Delphi survey!

Dear sir, madam,

Our research group has performed a systematic review of all available literature on the definition of anastomotic leakage as well as a consensus assessment among Dutch and Chinese colorectal surgeons. Based on the data collected in these studies, we can conclude that there is no consensus about what should comprise a general definition of anastomotic leakage. Due to the lack of such a globally accepted definition, comparability of study results as well as understanding between clinicians is hampered.
Since you have published three or more articles about this subject in the past years, we would like to ask your participation to complete this Delphi study. All panel members who complete the three rounds of this Delphi analysis, will be acknowledged in the paper.

This survey is the first round of the Delphi analysis and it consists of 14 questions. We request you to rate the appropriateness of the statements by the use of a 1 to 9 Leikert scale. There will also be a number of open-ended questions. The questionnaire will take approximately 10-15 minutes to complete. The deadline of this survey will be *February 27, 2019*.

We thank you in advance for your participation.

Yours faithfully,

Claire van Helsdingen anastomosis@amc.uva.nl

Also on behalf of Dr. J.P.M. Derikx and Prof. Dr. N.D. Bouvy

Please do not hesitate to contact us if you have any more questions.

Amsterdam UMC University Medical Centers | Maastricht UMC+

The definition of colorectal anastomotic leakage

Participant characteristics

1. Name

2. Institution

3. Country

4. To what extend do you have experience with colorectal anastomotic leakage?

- ◯ As a surgeon
- ◯ As a researcher
- ◯ As a radiologist
- ◯ Other (please specify)

The definition of colorectal anastomotic leakage

General definition of colorectal anastomotic leakage

5. Which of de following general definitions of AL is/are used in the hospital/research center in which you are currently employed:

- ◯ 1. A defect of the intestinal wall at the anastomotic site leading to a communication between the intra and extra luminal compartments
- ◯ 2. The leak of luminal content from a surgical joining between 2 hollow viscera
- ◯ 3. Leakage of bowel content or abscess formation near the anastomosis
- ◯ 4. Insufficiency of the anastomosis leading to a clinical state requiring intervention, confirmed by radiological studies, reoperation, or fecal discharge from the drain. (clinically manifest 318 The American Journal of Surgery, Vol 208, No 3, September 2014)
- ◯ 5. Defect of the intestinal wall integrity at the colorectal or colo-anal anastomotic site (including suture and staple lines of neorectal reservoirs) leading to a communication between the intra-and extraluminal compartments. A pelvic abscess close to the anastomosis is also considered as anastomotic leakage. (ISREC definition, Rahbari et al 2010)
- ◯ 6. Leakage of bowel content or abscess formation near the anastomosis for which a relaparotomy and/or radiologic drainage was conducted. (Dutch Surgical Colorectal Audit)
- ◯ A combination of or multiple of the abovementioned options, please indicate in the comment box below
- ◯ Other, please indicate

6. Comments

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The definition of colorectal anastomotic leakage

Clinical parameters

7. Which of the following clinical symptoms do you feel contribute to the suspicion of colorectal anastomotic leakage? Please rank the options where 1 contributes the most and 9 contributes the least.

- Tachycardia (>100 beats per minute)
- Tachypnea (>20 breaths per minute)
- (Sub-) febrile temperature (≥37.5 degrees Celsius or ≥99.5 degrees Fahrenheit)
- Post-operative ileus (>4days)
- Clinical deterioration
- Abdominal pain, other than wound pain
- Purulent/fecal discharge and/or gas in abdominal drain
- Purulent discharge from rectum
- Rectovaginal fistula
- Anastomotic defect found by digital examination
- Oliguria (<30ml per hour of <700ml per day)
- Agitation or lethargic

8. Comments

The definition of colorectal anastomotic leakage

Laboratory tests

9. How much do the following lab test contribute to the suspicion of colorectal anastomotic leakage on a scale from 1 to 9?

	1 (inappropriate)	2	3	4	5	6	7	8	9 (appropriate)
C-reactive protein elevation	○	○	○	○	○	○	○	○	○
Leukocytosis	○	○	○	○	○	○	○	○	○
Procalcitonin	○	○	○	○	○	○	○	○	○
Neutrophil to lymphocyte ratio	○	○	○	○	○	○	○	○	○
Albumin	○	○	○	○	○	○	○	○	○
Ureum	○	○	○	○	○	○	○	○	○
Creatinine	○	○	○	○	○	○	○	○	○

Comments

The definition of colorectal anastomotic leakage

Radiological parameters

10. How appropriate is it to define the following radiological findings as colorectal anastomotic leakage?

	1 (inappropriate)	2	3	4	5	6	7	8	9 (appropriate)
Extravasation of endoluminally administrated contrast on CT-scan/X-ray	○	○	○	○	○	○	○	○	○
Collection around the anastomosis on CT-scan	○	○	○	○	○	○	○	○	○
Presacral abscess near anastomosis on CT-scan	○	○	○	○	○	○	○	○	○
Presacral abscess not near anastomosis on CT-scan	○	○	○	○	○	○	○	○	○
Perianastomotic air on CT-scan	○	○	○	○	○	○	○	○	○
Free intra-abdominal air on CT-scan	○	○	○	○	○	○	○	○	○

Comments

The definition of colorectal anastomotic leakage

Relaparotomy findings

11. How appropriate is it to define the following findings during relaparotomy/relaparoscopy as colorectal anastomotic leakage?

	1 (inappropriate)	2	3	4	5	6	7	8	9 (appropriate)
Necrosis of anastomosis	◯	◯	◯	◯	◯	◯	◯	◯	◯
Necrosis of blind loop	◯	◯	◯	◯	◯	◯	◯	◯	◯
Signs of peritonitis	◯	◯	◯	◯	◯	◯	◯	◯	◯
Dehiscence of anastomosis	◯	◯	◯	◯	◯	◯	◯	◯	◯

Comments

The definition of colorectal anastomotic leakage

Grading systems

12. How appropriate is it to grade or classify the severity in case of diagnosis of colorectal anastomotic leakage?

1 (inappropriate)	2	3	4	5	6	7	8	9 (appropriate)
○	○	○	○	○	○	○	○	○

Comments

13. If anastomotic leakage is diagnosed, the following grade/classification is appropriate:

	1 (inappropriate)	2	3	4	5	6	7	8	9 (appropriate)
The international Study group of Rectal Cancer (ISREC) classification	○	○	○	○	○	○	○	○	○
The Clavien-Dindo classification	○	○	○	○	○	○	○	○	○

Comments

14. Please elaborate your answer on question 13.

15. Based on the ISREC classification, how appropriate is it to define the following grades as anastomotic leakage? Please elaborate.

	1 (inappropriate)	2	3	4	5	6	7	8	9 (appropriate)
Grade A : Anastomotic leakage requiring no active therapeutic intervention	○	○	○	○	○	○	○	○	○
Grade B: Anastomotic leakage requiring active therapeutic intervention, no reoperation	○	○	○	○	○	○	○	○	○
Grade C: Anastomotic leakage requiring reoperation	○	○	○	○	○	○	○	○	○

Elaboration/comments

16. Based on the Clavien-Dindo classification, how appropriate is it to define the following grades as anastomotic leakage? Please elaborate.

	1 (inappropriate)	2	3	4	5	6	7	8	9 (appropriate)
Grade I: Anastomotic leakage requiring any deviation from the normal postoperative course without the need for pharmacological treatment or surgical, endoscopic and radiological interventions	○	○	○	○	○	○	○	○	○
Grade II: Anastomotic leakage requiring pharmacological treatment with drugs other than such allowed for grade I complications. Blood transfusions and total parenteral nutritionare also included.	○	○	○	○	○	○	○	○	○
Grade III: Anastomotic leakage requiring surgical, endoscopic or radiological intervention	○	○	○	○	○	○	○	○	○
Grade IV: Anastomotic leakage with life-threatening complication (including CNS complications) requiring IC/ICU-management	○	○	○	○	○	○	○	○	○
Grade V: Death of a patient	○	○	○	○	○	○	○	○	○

Elaboration/comments

The definition of colorectal anastomotic leakage

Timing

17. How appropriate is it to set a range of post-operative days in which the leak should occur to define it as anastomotic leakage? Please elaborate.

1 (inappropriate)	2	3	4	5	6	7	8	9 (appropriate)
○	○	○	○	○	○	○	○	○

Elaboration/comments

18. According to your expertise, to speak about anastomotic leakage, it must occur in a range of … days post-operative. Please fill in the days:

19. A distinction should be made between early and late anastomotic leakage

1 (completely disagree)	2	3	4	5	6	7	8	9 (completely agree)
○	○	○	○	○	○	○	○	○

Comments

The definition of colorectal anastomotic leakage

Colon versus rectum

20. Colon and rectal anastomotic leakage should be considered as separate entities:

1 (completely disagree)	2	3	4	5	6	7	8	9 (completely agree)
○	○	○	○	○	○	○	○	○

Comments

The definition of colorectal anastomotic leakage

Thank you very much!

We would like to thank you for completing the first round of our Delphi analysis. All the responses will be analyzed and the results will be fed back to you in the second round. We will send you the link for the second survey by e-mail. Comments, suggestions or remarks from the first round will be added to the questionnaire.

If you have any questions or feedback please feel free to contact us.

Claire van Helsdingen
anastomosis@amc.uva.nl

Also on behalf of Dr. J.P.M. Derikx and Prof. Dr. N.D. Bouvy

Amsterdam UMC University Medical Centers | Maastricht UMC+

Round 2: The definition of colorectal anastomotic leakage (32)

Welcome to the second round of this Delphi study!

Dear panel member,

Thank you for finishing the first round of our Delphi analysis about the definition of colorectal anastomotic leakage.
We have already reached consensus in the majority of the items in the first questionnaire!

In this second round we ask you to fill in the same questionnaire, which is adapted following your feedback and additional remarks. Above each question we show a summary of both your answers and the group response. We ask you to reconsider your answers and if you wish, to revise them. After this round there will be a third and final round, in which we will provide an overview of the statements on which we have reached consensus. We will present the final statements and make a recommendation, to which remarks can be made once again.

The survey will approximately take 20 minutes to complete.

We thank you in advance for finishing the second questionnaire of our Delphi study.

Yours sincerely,

Claire van Helsdingen
anastomosis@amc.uva.nl

Also on behalf of Dr. J.P.M. Derikx and Prof. Dr. N.D. Bouvy

Please do not hesitate to contact us if you have any questions or problems

Round 2: The definition of colorectal anastomotic leakage (32)

General definition of colorectal anastomotic leakage

Please rate all statements again, in the same manner as in round one by use of a 1-9 scale (not applicable on the open-ended questions and multiple choice questions). Low rating (1) indicates that it is inappropriate. High rating (9) indicates that it is appropriate . Alterations and/or additives are marked with an asterisk (*). Under the question you can find the explanation of the alteration/additive or remarks made by panel members, also marked with an asterisk(*).

An overview of the results of the first round of the Delphi analysis is visible above each question. The percentages display the distribution of the group response, while the orange tinted sections represent your answer. Please compare your answer with the group response and optionally revise your answers or provide arguments in the comment field if you do not agree.

(1) Which of de following general definitions of AL is/are used in the hospital/research center in which you are currently employed:

1.	A defect of the intestinal wall at the anastomotic site leading to a communication between the intra and extra luminal compartments	4%
2.	The leak of luminal content from a surgical joining between 2 hollow viscera	9%
3.	Leakage of bowel content or abscess formation near the anastomosis	0%
4.	Insufficiency of the anastomosis leading to a clinical state requiring intervention, confirmed by radiological studies, reoperation, or fecal discharge from the drain.	9%
5.	Defect of the intestinal wall integrity at the colorectal or colo-anal anastomotic site (including suture and staple lines of neorectal reservoirs) leading to a communication between the intra-and extraluminal compartments. A pelvic abscess close to the anastomosis is also considered as anastomotic leakage.	48%
6.	Leakage of bowel content or abscess formation near the anastomosis for which a relaparotomy and/or radiologic drainage was conducted.	4%
7.	A combination of or multiple of the abovementioned options	26%
8.	Other	

Summary results round 1

Your response

1. Which of de following general definitions of AL would you define as the most suitable definition:

- 1. A defect of the intestinal wall at the anastomotic site leading to a communication between the intra and extra luminal compartments
- 2. The leak of luminal content from a surgical joining between 2 hollow viscera
- 3. Leakage of bowel content or abscess formation near the anastomosis
- 4. Insufficiency of the anastomosis leading to a clinical state requiring intervention, confirmed by radiological studies, reoperation, or fecal discharge from the drain. (clinically manifest 318 The American Journal of Surgery, Vol 208, No 3, September 2014)
- 5. Defect of the intestinal wall integrity at the colorectal or colo-anal anastomotic site (including suture and staple lines of neorectal reservoirs) leading to a communication between the intra-and extraluminal compartments. A pelvic abscess close to the anastomosis is also considered as anastomotic leakage. (ISREC definition, Rahbari et al 2010)
- 6. Leakage of bowel content or abscess formation near the anastomosis for which a relaparotomy and/or radiologic drainage was conducted. (Dutch Surgical Colorectal Audit)

Comments

Clinical parameters

(2) Which of the following clinical symptoms do you feel contribute to the suspicion of colorectal anastomotic leakage? Please rank the options where 1 contributes the most and 9 contributes the least.

We received many comments on this question, for which we want to thank all the panel members. Based on these remarks we had to conclude that the question was not formulated correctly, our apologies for that. We have decided to change the question to the format of rating statements in a 1-9 Leikert scale, the same way as the other questions in the first survey. We realize that most of the clinical symptoms, in themselves, are not specific for anastomotic leakage. However, we would like to ask you to rate the symptoms for appropriateness, assuming that you have a clinical suspicion of colorectal anastomotic leakage in any way whatsoever.

2. How appropriate is it to consider the following clinical symptoms as a suspicion of colorectal anastomotic leakage?

	(Inappropriate) 1	2	3	4	5	6	7	8	(Appropriate) 9
Tachycardia (>100 beats per minute)	○	○	○	○	○	○	○	○	○
Tachypnea (>20 breaths per minute)	○	○	○	○	○	○	○	○	○
(Sub-) febrile temperature (≥37.5 degrees Celsius or ≥99.5 degrees Fahrenheit)	○	○	○	○	○	○	○	○	○
Post-operative ileus (>4days)	○	○	○	○	○	○	○	○	○
Clinical deterioration	○	○	○	○	○	○	○	○	○
Abdominal pain, other than wound pain	○	○	○	○	○	○	○	○	○
Purulent/fecal discharge and/or gas in abdominal drain	○	○	○	○	○	○	○	○	○
Purulent discharge from rectum	○	○	○	○	○	○	○	○	○
Rectovaginal fistula	○	○	○	○	○	○	○	○	○
Anastomotic defect found by digital examination	○	○	○	○	○	○	○	○	○
Oliguria (<30ml per hour of <700ml per day)	○	○	○	○	○	○	○	○	○
Agitation or lethargic	○	○	○	○	○	○	○	○	○

Comments

Round 2: The definition of colorectal anastomotic leakage (32)

Laboratory tests

(3) How much do the following lab tests contribute to the suspicion of colorectal anastomotic leakage on a scale from 1 to 9?

	Inappropriate 1	2	3	4	5	6	7	8	Appropriate 9
CRP				4%	4%	13%	26%	22%	30%
Leukocytosis	9%	4%		9%	17%	35%	4%	17%	4%
Procalcitonin	9%	9%		17%	13%	22%	17%	9%	4%
Neutrophil to lymphocyte ratio	13%	4%	4%	22%	17%	17%	13%	9%	
Albumin	30%	26%	9%	9%	22%	4%			
Ureum	22%	30%	17%	13%	13%	4%			
Creatinine	22%	26%	22%	13%	13%	4%			

Summary results round 1

Your response

3. How much do the following lab test contribute to the suspicion of colorectal anastomotic leakage on a scale from 1 to 9?

	(Inappropriate) 1	2	3	4	5	6	7	8	(Appropriate) 9
C-reactive protein elevation	○	○	○	○	○	○	○	○	○
Leukocytosis	○	○	○	○	○	○	○	○	○
*Combination of CRP and leukocytosis	○	○	○	○	○	○	○	○	○
Procalcitonin	○	○	○	○	○	○	○	○	○
Neutrophil to lymphocyte ratio	○	○	○	○	○	○	○	○	○
Albumin	○	○	○	○	○	○	○	○	○
Ureum	○	○	○	○	○	○	○	○	○
Creatinine	○	○	○	○	○	○	○	○	○

Comments

*"A combination of CRP and leukocytosis. Also, rather than absolute values, the trends would be more reliable"

Round 2: The definition of colorectal anastomotic leakage (32)

Radiological parameters

(4) How appropriate is it to define the following radiological findings as colorectal anastomotic leakage?

	Inappropriate 1	2	3	4	5	6	7	8	Appropriate 9
Extravasation endoluminal contrast		4%		4%				4%	87%
Collection around the anastomosis				4%	4%	17%	26%	35%	13%
Presacral abscess near anastomosis						13%	22%	48%	17%
Presacral abscess not near anastomosis		9%	26%	9%	26%	17%	4%	9%	
Perianastomotic air			4%	4%		17%	30%	17%	26%
Free intra-abdominal air		9%	4%	4%	13%	9%	17%	26%	17%

Summary results round 1

Your response

4. How appropriate is it to define the following radiological findings as colorectal anastomotic leakage?

	(Inappropriate) 1	2	3	4	5	6	7	8	(Appropriate) 9
Extravasation of endoluminally administrated contrast on CT-scan/X-ray	○	○	○	○	○	○	○	○	○
Collection around the anastomosis on CT-scan	○	○	○	○	○	○	○	○	○
Presacral abscess near anastomosis on CT-scan	○	○	○	○	○	○	○	○	○
Presacral abscess not near anastomosis on CT-scan	○	○	○	○	○	○	○	○	○
Perianastomotic air on CT-scan	○	○	○	○	○	○	○	○	○
*Free intra-abdominal air on CT-scan	○	○	○	○	○	○	○	○	○

Comments

* *Taking into account the time after surgery and the difference between open and laparoscopic surgery*

Round 2: The definition of colorectal anastomotic leakage (32)

Relaparotomy findings

(5) How appropriate is it to define the following findings during relaparotomy/relaparoscopy as colorectal anastomotic leakage?

	Inappropriate 1	2	3	4	5	6	7	8	Appropriate 9
Necrosis of anastomosis		4%			4%			13%	78%
Necrosis of blind loop		4%			9%	9%	13%	13%	48%
Signs of peritonitis					17%	13%	26%	13%	30%
Dehiscence of anastomosis		4%				4%			91%

Summary results round 1

Your response

5. How appropriate is it to define the following findings during relaparotomy/relaparoscopy as colorectal anastomotic leakage?

	(Inappropriate) 1	2	3	4	5	6	7	8	(Appropriate) 9
Necrosis of anastomosis	○	○	○	○	○	○	○	○	○
Necrosis of blind loop	○	○	○	○	○	○	○	○	○
Signs of peritonitis	○	○	○	○	○	○	○	○	○
Dehiscence of anastomosis	○	○	○	○	○	○	○	○	○

Comments

Round 2: The definition of colorectal anastomotic leakage (32)

Grading systems

(6) How appropriate is it to grade or classify the severity in case of diagnosis of colorectal anastomotic leakage?

Inappropriate 1	2	3	4	5	6	7	8	Appropriate 9
						35%	4%	61%

Summary results round 1

Your response

6. How appropriate is it to grade or classify the severity in case of diagnosis of colorectal anastomotic leakage?

(Inappropriate) 1	2	3	4	5	6	7	8	(Appropriate) 9
○	○	○	○	○	○	○	○	○

Comments

(7) If anastomotic leakage is diagnosed, the following grade/classification is appropriate:

	Inappropriate 1	2	3	4	5	6	7	8	Appropriate 9
ISREC					4%	17%	13%	17%	48%
Clavien-Dindo	4%		4%		17%	17%	17%	17%	22%

Summary results round 1

Your response

7. If anastomotic leakage is diagnosed, the following grade/classification is appropriate:

	(Inappropriate) 1	2	3	4	5	6	7	8	(Appropriate) 9
The international Study group of Rectal Cancer (ISREC) classification	○	○	○	○	○	○	○	○	○
The Clavien-Dindo classification	○	○	○	○	○	○	○	○	○

Comments

(8) Based on the ISREC classification, how appropriate is it to define the following grades as anastomotic leakage?

	Inappropriate 1	2	3	4	5	6	7	8	Appropriate 9
Grade A			4%	4%				30%	61%
Grade B			4%			9%	4%	26%	57%
Grade C						4%	13%	22%	61%

Summary results round 1

Your response

8. Based on the ISREC classification, how appropriate is it to define the following grades as anastomotic leakage?

	(Inappropriate) 1	2	3	4	5	6	7	8	(Appropriate) 9
Grade A : Anastomotic leakage requiring no active therapeutic intervention	○	○	○	○	○	○	○	○	○
Grade B: Anastomotic leakage requiring active therapeutic intervention, no reoperation	○	○	○	○	○	○	○	○	○
Grade C: Anastomotic leakage requiring reoperation	○	○	○	○	○	○	○	○	○

Comments

(9) Based on the Clavien-Dindo classification, how appropriate is it to define the following grades as anastomotic leakage?

	Inappropriate 1	2	3	4	5	6	7	8	Appropriate 9
Grade I	9%		4%		9%		26%	9%	43%
Grade II	4%		9%		9%	13%	13%	4%	48%
Grade III	4%		4%	4%	4%	4%	22%	13%	43%
Grade IV	4%	4%	4%		4%	4%	13%	17%	48%
Grade V	9%	4%			4%		4%	9%	70%

Summary results round 1

Your response

9. Based on the Clavien-Dindo classification, how appropriate is it to define the following grades as anastomotic leakage?

	(Inappropriate) 1	2	3	4	5	6	7	8	(Appropriate) 9
Grade I: Anastomotic leakage requiring any deviation from the normal postoperative course without the need for pharmacological treatment or surgical, endoscopic and radiological interventions	○	○	○	○	○	○	○	○	○
Grade II: Anastomotic leakage requiring pharmacological treatment with drugs other than such allowed for grade I complications. Blood transfusions and total parenteral nutritionare also included.	○	○	○	○	○	○	○	○	○
*Grade IIIa: Anastomotic leakage requiring surgical, endoscopic or radiological intervention not under general anaesthesia	○	○	○	○	○	○	○	○	○
*Grade IIIb: Anastomotic leakage requiring surgical, endoscopic or radiological intervention under general anaesthesia	○	○	○	○	○	○	○	○	○

	(Inappropriate) 1	2	3	4	5	6	7	8	(Appropriate) 9
*Grade IVa: Anastomotic leakage with life-threatening complication (including CNS complications) requiring IC/ICU-management with single organ dysfuction (including dialysis)	○	○	○	○	○	○	○	○	○
*Grade IVb: Anastomotic leakage with life-threatening complication (including CNS complications) requiring IC/ICU-management with multiorgan dysfunction	○	○	○	○	○	○	○	○	○
Grade V: Death of a patient	○	○	○	○	○	○	○	○	○

Comments

**Dividing grade III in IIIa and IIIb, based on the anaesthesia given during the intervention*
**Dividing grade IV in IVa and IVb based on single or multi organ failure*

Round 2: The definition of colorectal anastomotic leakage (32)

Timing

(10) How appropriate is it to set a range of post-operative days in which the leak should occur to define it as anastomotic leakage?

Inappropriate								Appropriate
1	2	3	4	5	6	7	8	9
22%		22%	4%	17%	4%		4%	22%

Summary results round 1

Your response

10. How appropriate is it to set a range of post-operative days in which the leak should occur to define it as anastomotic leakage?

(Inappropriate)								(Appropriate)
1	2	3	4	5	6	7	8	9
○	○	○	○	○	○	○	○	○

Comments

''Literature shows AL is possible between the first post-operative day and several months''
''Although most relevant leaks occur early, a not negligible part is detected later''
''Since not all mechanisms underlying AL are clear, it would be inappropriate to set a range''
''Early and late leakage is quite different''

11. According to your expertise, to speak about anastomotic leakage, it must occur in a range of … days post-operative.

The answers varied from no range, 1 day, up till 365 days

(12) A distinction should be made between early and late anastomotic leakage.

Completely disagree 1	2	3	4	5	6	7	8	Completely agree 9
9%		4%			17%	9%	13%	43%

Summary results round 1

Your response

12. A distinction should be made between early and late anastomotic leakage

(Completely disagree) 1	2	3	4	5	6	7	8	(Completely agree) 9
○	○	○	○	○	○	○	○	○

Comments

"The mechanisms are not the same"

"They could be due to different causes, have different aetiology"

"The aetiology is likely the same"

"Technical failure mostly early, however symptoms can be late"

Colon versus rectum

(13) Colon and rectal anastomotic leakage should be considered as separate entities

Completely agree 1	2	3	4	5	6	7	8	Completely agree 9
4%	13%	4%		9%	4%	9%	13%	35%

Summary results round 1

Your response

13. Colonic anastomotic leakage and rectal anastomotic leakage should be considered as two seperate problems, based on different incidence rates, different anatomy, different surgical techniques

(Completely disagree) 1	2	3	4	5	6	7	8	(Completely agree) 9
○	○	○	○	○	○	○	○	○

Comments

Thank you very much!

We would like to thank you for completing the second round of our Delphi analysis. All the responses will be analyzed and we will send you an overview with the statements on which we have reached consensus, together with the final statements and a recommendation, which will serve as our third and final round of the Delphi analysis about the definition of colorectal anastomotic leakage.

If you have any questions or feedback please feel free to contact us.

Claire van Helsdingen
anastomosis@amc.uva.nl

Also on behalf of Dr. J.P.M. Derikx and Prof. Dr. N.D. Bouvy

Supplement 5 Final round

Dear …,

Thank you for participating in our Delphi analysis. We have analyzed all statements and we are pleased to tell you that we have reached consensus in 39 out of 48 statements (81%).

In this final round we will present our recommendation regarding the definition of colorectal anastomotic leakage. We kindly ask you to reply to this e-mail if you agree or disagree with our recommendations before … . If you disagree please provide arguments and additional suggestions. We will publish all results and take your arguments into account in the discussion.

Recommendation
The following recommendation is based on statements in which we reached consensus without disagreement according to the IPRAS formula. For an overview of all reviewed statements see the attachment.

1. General definition
   1.1 The ISREC definition of CAL is used by the majority of the participants (71%).

2. Clinical symptoms
   2.1 Tachycardia, clinical deterioration, abdominal pain other than wound pain , discharge from the abdominal drain, discharge from the rectum, rectovaginal fistula and anastomotic defect found by digital examination are clinical symptoms that contribute to the suspicion of CAL

3. Laboratory tests
   3.1 CRP and the combination of CRP and leukocytosis are appropriate laboratory tests and should be tested if there is a suspicion of CAL.

   3.2 Albumin, urea and creatinine do not contribute to the suspicion of CAL and therefore should not be tested.

4. Radiological findings
   4.1 Extravasation of endoluminally administrated contrast, collection around the anastomosis, presacral abscess near the anastomosis, perianastomotic air and free intra-abdominal air should be defined as CAL on CT-scan. However, defining free intra-abdominal air as CAL depends on the amount of post-operative days.

5. Findings during reoperation
   5.1 Necrosis of the anastomosis, necrosis of the blind loop, signs of peritonitis and dehiscence of the anastomosis should all be defined as CAL when observed during reoperation.

6. Grading systems
   6.1 It is important to grade of classify CAL.

   6.2 Both the ISREC-classification and Clavien-Dindo classification are appropriate grading systems.

7. Timing
   7.1 Distinction between early and late anastomosis should be made.

   7.2 There should not be a fixed range of days in which CAL can occur to define it as CAL.

8. Colon/rectum
   8.1 Colonic anastomotic leakage and rectal anastomotic leakage should be seen as two separate problems, based on different incidence rates, different anatomy, different surgical technique.

Please reply if you agree or disagree. In case you disagree please note the concerning header and explain why you disagree.

Thank you in advance.

Yours sincerely,

Claire van Helsdingen
anastomosis@amc.uva.nl

Also on behalf of Dr. J.P.M. Derikx and Prof. Dr. N. Bouvy