ENTRY FOR

THOMSON MEMORIAL MEDAL

CASES OF

CONGENITAL PYLORIC STENOSIS

James A.L. Gilbert

Summer Session

1941

NAME – DAVID THOMSON
AGE 3/52
ADMITTED 29/8/40
DISCHARGED 23/11/40
DISEASE – PYLORIC STENOSIS.

ADDRESS – 46 ST. CLAIR ST. KIRKCALDY
BIRTHDAY 9/8/40
RECOMMENDED by Dr Foreman Kirkcaldy.

RESULT – OPERATION – RECOVERY.

SUMMARY.

Vomiting at 10 days – weaned at 2 weeks. Admitted at 3/52 B.W. 8lbs 5oz. Weight on admission 6lbs 4oz. Operation on 8th day. Recovery slow. Double otitis media Artificial sunlight seemed to be beneficial.

HISTORY

F.T.; S.D; B.W. 8lbs 5oz. Born in Kirkcaldy Hospital. Breast fed for 2 weeks but stopped on account of vomiting. On artificial food 4 days. Began vomiting after discharge home at age of 10 days. Vomiting after every feed and is projectile. Losing weight. He is eager for his food, but little satisfies him. Bowels constipated for last 10 days – one motion every second day – sometimes green. Small fleck of blood in stool. Very little crying. No cough. No fits. No urinary symptoms. Not unduly weak. Eyes bright.

FAMILY

FATHER 27 Plasterer
MOTHER 23
CHILDREN ♂ one 3/52 (patient)

EXAMINATION

GENERAL CONDITION AGE 6/52 WEIGHT 5lb 10 oz

General condition fairly good HEIGHT 19½"

Rather a small baby. T 97°

P 146

R ?

SURFACE Head well shaped - small Fontanelle admits 4 fingers - Sutures overlap slightly. Thorax and limbs proportionate. Face small and wizened like an old man.

NUTRITION - Thin baby & considerable loss of subcutaneous tissue

SURFACE - SKIN rather pallor - Rather dry & scaly on abdomen. mucous membranes moist and good colour. Eyes and ears normal.

MUSCULATURE Poorly developed.

MENTAL CONDITION - active baby - with rather an anxious look.

AILMENTARY SYSTEM Abdomen moves on respiration upper abdomen rather full. No definite peristalsis seen. No tumour felt. Liver & spleen not palpably enlarged.

CARDIO VASC. SYSTEM Pulse regular - Heart sounds closed.

RESPIRATORY SYSTEM Expansion fairly good - Percussion - Note resonant. Auscultation - B.S.

RENAL SYSTEM - Kidneys not enlarged Urine - alkaline - No albumen - No sugar - No deposit

NERVOUS SYSTEM No neck rigidity. Pupils equal and react to light. No twitchings.
GASTIC JUICE :- Free HCl 14.3 cc N/10 Total acid = 53 cc N/10
3.9.40 – Barium meal. Barium series shows considerable gastric retention up to 6 hours suggesting a pyloric stenosis.
Continually vomiting. Having gastric lavage but little in it due to frequent vomiting. No peristalsis seen and no more than suspicion of tumour on palpation.

PROVISIONAL DIAGNOSIS – Vomiting ? Pyloric Stenosis
5.9.40 - Vomiting and Barium meal suggests pyloric stenosis but clinically no peristalsis seen or tumour felt. It was considered that this might be a rare case of peptic ulcer causing vomiting. Rammstedt's operation performed by Sir John Fraser. Typical tumour of moderate degree. General anaesthetic.
10.9.40 Doing very well.
16.9.40 Check in progress for no known reason. Not taking feeds as well as before but looks very well.
23.9.40 Progressing well now.

30.9.40 SUMMARY TO DATE
This case of pyloric stenosis came in to the ward in relatively poor condition and despite frequent vomits his condition was improved before operation. He presented some difficulty in accurate diagnosis due to the absence of peristalsis and inability to feel tumour but at operation a typical tumour was present. Child is making satisfactory progress.

5·10·40 Sugar has been increased. 4 stools in night.
7·10·40 Sugar reduced. Fewer stools.
8·10·40 No gain in weight., Not so well.
9·10·40 Both ears discharging Thin yellow pus.
Smear Taken.
10·10·40 Pathological Report. Numerous mixed organisms in direct film. many staphylococci and diphtheroid bacilli in culture. No B. diphtheriae No tubercle bacilli
14·10·40 Ear discharging again.
16·10·40 Increased discharge from ear.
20·10·40 Not gaining well. Ear still discharging badly.
27·10·40 Refuses to gain weight. Ear discharging. On Neotles
30·10·40 Ears discharging less. Not gaining weight.
5·11·40 Gaining weight. Improving. W.B.C. 10,000
Hg. 52% R.B.C. 3,980,000.
11·11·40 Improving slowly.
12·11·40 Alternate feeds of Neotles 1:8 + milk & water 3 & 1
15·11·40 Feed increased to 4 oz. Only 1 Neotle feed in day.
20·11·40 Gaining weight. Ears drying up.
22·11·40 Still gaining weight. — For discharge
23·11·40 Discharged home.

SUMMARY

a case of pyloric stenosis which was operated on, and did not respond immediately to operation. Both ears discharged and he was slow to gain weight. However Neotles milk helped him greatly and at time of discharge he was progressing favourably.

NAME WHITE THOMAS
AGE 8/52
ADMITTED 10·3·41
DISCHARGED 7·4·41.
DISEASE PYLORIC STENOSIS

ADDRESS DRILL HALL BERWICK
BIRTHDAY 17·1·41
RECOMENDED BY Dr. CALDER

RESULT ÷ OPERATION RECOVERY.

FAMILY HOME
FATHER -23 ARMY
MOTHER -23
CHILDREN - 1

HISTORY

PRESENT ILLNESS

R.S.M.P., F.T. Forceps ? reason - labour only 4 hours. Baby probably shocked at birth. B.W. 6 lbs 8½ oz. B.T. 3 hrly. Went home on 9th day. 3-4 days later vomiting began - mouthfuls ¼ of hour after most feeds. Bowels moved regularly soft yellow motions. Flatulence until 2 weeks ago. Vomiting has continued and now occurs usually 5 minutes after a feed. Sometimes "shoots out on the floor" - often fairly large quantity. Baby hungry for feeds. appears to be losing weight. No constipation

Family History

EXAMINATION

GENERAL CONDITION — WEIGHT 8lbs 3oz
STRUCTURE - Slightly undersized for age. Fontanelle admits ½ finger average tension. No congenital abnormality. Oval head. — HEIGHT 21" — T 98·8° — P 134 — R 32.

NUTRITION - Fairly well nourished.

SURFACES - Face pale. Mucous membranes moderately good colour. Throat clean. Tongue moist but slightly furred. Very little hair. Ears satisfactory. Eyes bright.

MUSCULAR CONDITION - Normal activity.

MENTAL CONDITION - appears of average intelligence. Not irritable.

ALIMENTORY SYSTEM - Tongue as above. Abdomen rounded - moves with respiration. Gastric peristalsis visible - definite. No tumour felt. Liver and spleen not enlarged. No tenderness. No rigidity.

RESPIRATORY SYSTEM - Breathing normal. Chest moves well on respiration. Note resonant throughout. Sounds vesicular with no accompaniments.

NERVOUS SYSTEM - Pupils equal - regular reaction to light. No neck rigidity. No spasticity. Reflexes normal.

RENAL SYSTEM - Kidneys not palpable. No tenderness. URINE - No sugar - No albumen nothing abnormal.

CARDIO VASCULAR SYSTEM Pulse regular - good volume. A B not localised. Sounds closed and pure in all areas.

12.3.41 Sumydrin mist T.d.s. Gastric residue 3ii
14.3.41 - Gained weight. Constant residue. No vomiting. Nasal catheter.
16.3.41 Vomiting again - Projectile.
17.3.41 Another gain in weight - but still vomiting. Stools improving. 3i residue very thick. No tumour felt.
21.3.41 - Prepared for operation.
Luminal gr½ pre op.
Operation - Rammstedts Miss Mackay=

Anaesthetic
Novocain
Ethyl Chloride & Ether

Tumour small and hard, ∧ up very high. Baby very noisy. General anaesthetic for stitching abdomen.

PROVISIONAL DIAGNOSIS ? Pyloric Spasm ? Stenosis

Condition at end of operation fair.
21.3.41 No vomiting. Taking feeds well. Has had one stool. Subcutaneous saline not considered necessary.
22.3.41 Going on well. Rise of temperature yesterday, considered mostly due to electric heat.
23.3.41 - Has passed several large stools. Buttocks red. Going on well.
27.3.41 - Satisfactory - hungry.

30·3·41 Has passed several large stools - six - Petroleum emulsion & glucose saline. Stitches out. Wound satisfactory.

31·3·41 - Ceased to have loose stools. To go on milk & water mixture.

5·4·41 - Stools rather frequent. Not gaining weight. Feed increased ½ oz. Looks fairly well.

7·4·41 - Taking feed well - gaining weight. Stools normal. Wound well healed.

For Home.

SUMMARY.

This baby had a fairly typical history of a pyloric stenosis - starting about second week. Visible peristalsis. No tumor felt. He was treated with eumydrin for 10 days but vomiting continued and he began to loose weight. Rammstedt's operation was therefore done. Post operatively the child did well. No vomiting Stools became normal. He gained weight.

NAME BELL KEITH ADDRESS % COMBE I WARD PLACE
AGE 3/52
ADMITTED 13.2.41 BIRTHDAY 18.1.41
DISCHARGED 17.4.41 RECOMMENDED M.O.P.D.
DISEASE PYLORIC STENOSIS

RESULT OPERATION

SUMMARY

FAMILY HOME
FATHER 25 - SAILOR
MOTHER 23
CHILDREN 2
♀ died at 11 weeks? Pyloric Sten. O.D.
♂ 3/52

HISTORY

PRESENT ILLNESS

F.T., S.D., E.I.M.M.H. B.W. 6lbs 10oz. B.F. for 14 days but artificial feeding started because baby's clothes caught fire and although only the baby's little toe was burned the mother got such a fright that she had no milk.
2 oz ½:½ milk and water + teaspoonful sugar 4 hourly. When at breast last day vomited after each feed. Vomiting is increasing sometimes while being fed and at other times ½ hour after - projectile "right into the fireplace" - large quantity. Bowels move every second day - dark green motions constipated. Baby hungry and cries for its feeds. Losing a lot of weight. Does not pass much water.
Family History. Previous child died at 1½ two years ago - "went same way" and had operation

in Hall for "twisted bowels" and "blockage of stomach" at 5/52.

EXAMINATION

GENERAL CONDITION AGE 32/52

WEIGHT 5 lbs 14 oz
HEIGHT 19½"
T 98·4°F
P 132
R 36

Structure – Average length and proportion. No congenital abnormalities. Fontanelle admits two fingers – Normal tension.

Nutrition – very poor. Has lost considerable weight Limbs, face, & trunk very poorly covered.

Surfaces – Left small toe – scab. Left groin one septic spot. Umbilicus satisfactory. Perineum. No hernia. Skin dry and inelastic. Mucous membranes relatively good colour. Tongue clean but dry. Eyes dull.

Muscular Condition – Tone not much impaired.

Mental Condition – Irritable

Alimentary System – Tongue as above. Abdomen slightly distended. Visible gastric peristalsis. No tenderness. No rigidity. Pylorus felt in R. Hypochondrium. Liver & spleen not enlarged.

Respiratory System. Breathing easy. Chest moves well. Note resonant throughout. Sounds vesicular with no accompaniments.

Cardio Vasc. System. Pulse rate & volume fairly good apex beat not localised. Sounds closed & pure in all areas.

NERVOUS SYSTEM Pupils equal and regular, and to light. No neck rigidity. No spasticity.

RENAL SYSTEM – Kidneys not palpable.
Urine – Neutral. No albumen. No sugar

14.2.41 – Has had Two projectile vomits. S.S. 60 cc o
G.L. 3ī. Eumydrin ī T.d.s. B.N.O. To have daily S.S.
15.2.41 Less vomiting. No residue. B.O.ī
16.2.41 Still very large projectile vomits.
17.2.41 Has gained a very little weight. Still vomiting. B.O. several times.
19.2.41 Gastric Residue 3xiv. Slightly loose stool.
22.2.41 – Pre operative Treatment. S.S. 9.R. 36. B.O.

OPERATION – Rammstedt's – Miss MacKay.
Anaesthetic Novocain. R. paramedian incision Small, but very hard Tumour found. Stomach much enlarged. Proved diagnosis – Pyloric Stenosis Abdomen closed with continuous silk Condition at end of operation good.
21.2.41 Going very well. Taking glucose & Nestles. B.O. No vomiting.
23.2.41 – Doing well. Eggs for feeds. B.O.
24.2.41 – Has lost a little weight.
26.2.41. – Pus from lower end of wound. Taking feeds well. B.O. One vomit.
27.2.41 – Pathological Report. Pus – B proteus & Staphylococci as culture.
Lower end of wound gaping – fair amount of pus. To have saline & glucose & milk of magnesia 3ss
28.2.41 – Lost weight. Fair amount of pus from lower end of wound. To have fomentations.
2.3.41 – 3iii Nestles 1:8. Still taking feeds well

a little cough. Nil in chest. Less discharge from wound. Usual dressing.
3.3.41 — Stitches taken out. ½" at lower end of wound not adhering. Less pus. Baby weaker.
4.3.41 — Lost weight.
5.3.41 — Green loose stools. Wound healing. Virol 3¼ b.d. Nestles milk 5 feeds. Skim milk and water 2 feeds.
6.3.41. Stop Virol. Baby weaker.
7.3.41. Very frequent stools. Poor condition Cough makes him vomit.
8.3.41 — Nestles 1–10. Very weak. mouth open. Taking feeds very very slowly.

9.3.41 No cough. Stools 1.S.Q.
10.3.41 — Petroleum Emulsion — stop Bismuth. Nestles 1:8 4 feeds
12.3.41 — Gastric lavage — clear vomit.
14.3.41 — Stools definitely better. Less cough. Wound healing. Gained a little weight. Colour better Stronger.
17.3.41 — Gained more weight. Taking feeds well. Infrequent cough. Stools frequent but still improving. Satisfactory slow improvement.
19.3.41 — Has gained a little more weight.
21.3.41 — Lost a little weight. Taking feeds well.
23.3.41 — Wound almost healed. Stools 1.S.Q. No vomiting. Taking feeds well. Chest clearer. much less cough.
Path. Report — mouth swab. no thrush found.
25.3.41 — mouth swab. much thrush fungus present. Gentian violet. Taking feeds well. Wound almost completely healed.
27.3.41 — Gained weight again.

30.3.41 – Rise in temperature. Rapid pulse today. Sepsis in middle of wound – discharging thick pus. Swab taken Fomentations.
5.4.41 – Wound practically healed. Baby much better & has gained weight. Soon ready for home.
9.4.41 – To have 3 feeds milk 2 water 1 and 4 feeds Nestles.
12.4.41. Gaining weight. Taking feeds well. Wound quite healed.
14.4.41 – On to whole milk & water feeds. Quite satisfactory.
16.4.41 – Gaining weight. Stools satisfactory. Now ready for home.

Final Diagnosis – Pyloric Stenosis (Rammstedt's Operation

Summary. A case of pyloric stenosis with a typical history but rather an early onset. Treated with mumydrin for 6 days but did not improve. Vomiting continued and gastric residue increased.
Rammstedt's operation was then done and a small but very hard tumour found. After operation his recovery was retarded because the wound went septic. This eventually healed up and he gained weight. Condition on discharge quite satisfactory.

NAME MAGUIRE MICHAEL. ADDRESS 41 CRAG CRES.
AGE 6/52 BIRTHDAY 28.2.41
ADMITTED 14.4.41 RECOMMENED BY Dr HENDERSON

FAMILY HOME
FATHER 30
MOTHER 27
CHILDREN
♂ Twins 6/52

HISTORY

Present Illness – Forcible vomiting for 3 days.
Baby was one of twins born at Simpson Maternity Pavilion 6 weeks ago. First pregnancy 2/52 premature B.W 5lbs 3oz – Breast fed while in Hospital for 2/52 No vomiting – stools normal. Practically regained birth weight on discharge from Hospital. Since leaving Hospital has been fed on Nestle's – 11 teasp to 4 Tablesp. water 3 hourly – gained weight and was satisfied – just an occasional vomit with flatulence – 3 days ago vomiting started and he has vomited persistently since. bowels propeatle – very large amounts and curdled – very hungry for feeds.
Bowels moved once daily – not constipated.
Passing urine normally – sleeps well.
Has lost weight during last three days.
Peristalsis seen at the clinic in Simpson Maternity Hospital Thur afternoon.
Twin brother – healthy B.W. 5lb 6oz now 4 lbs
Family History – no family history – quite healthy

EXAMINATION

STRUCTURE - average size baby. HEIGHT 20"
Normal proportions. Fontanelle WEIGHT 6¼lbs
2/sutures open and normal tension

NUTRITION - very thin. Skin loose and wrinkled over body and limbs.

SURFACES Considering loss of weight, skin of relatively good tone and of fair colour. Tongue slightly dry and reddened. Throat healthy.

MUSCULAR CONDITION - surprisingly good tone and strength. Cries lustily.

MENTAL CONDITION - appears bright. Eyes bright.

Temperature 97.8° Pulse 124 Resp. Rate 28.

DIGESTIVE SYSTEM Abdomen thin and retracted. Difficult to palpate due to crying. On examination no peristalsis seen, and no tumour felt. Liver and spleen not enlarged.

GENITO URINARY SYSTEM - Kidneys not palpable.
URINE - albumen negative. Nil microscopic.

RESPIRATORY SYSTEM - No cough heard. Chest moves well for age. Normal vesicular breath sounds. No accompaniments. No dullness.

CIRCULATORY SYSTEM - Pulse regular and of normal volume. Heart sounds pure and closed in all areas. No murmurs.

CENTRAL NERVOUS SYSTEM — No neck rigidity
Knee jerks present.

PROVISIONAL DIAGNOSIS ? PYLORIC STENOSIS

TREATMENT + PROGRESS

15.4.41 Peristalsis seen today. No tumour felt - vomited 3 times in night, but not projectile. Gastric residue 12 drs mane, 8 drs nocte. To have subcutaneous salines B.D. Eumydrin m i t.i.d.

16.4.41 — Has not vomited so frequently today — 3 times - not definitely projectile. Gastric residue 8 drs mane, 16 drs nocte. General condition slightly improved. Fontanelle still slightly depressed.

17.4.41 — General condition much the same. Fontanelle not quite so depressed. Gastric residue 8 drs mane. Projectile vomit in evening.

18.4.41 — Has had 3 large vomits during night - Gastric residue 8 drs. Condition, since admission, has not really improved.

19.4.41 Three large vomits during night. Gastric residue 8 drs. General condition rather poorer — 30 c.c. blood given intra-fontanelle.

20.4.41 — Rammstedt's Operation - Miss Herzfeld. Luminal ½ gr. Novocain - Ethyl Chloride & Ether. Right paramedian incision - Tumour ½" long & firm. Mucous membrane of stomach perforated. Two sutures to close the perforation. Peritoneum stitched. Abdomen then became very distended and in spite of passing stomach tube the distension was not relieved — ? gas in peritoneal cavity. General anaesthetic then

given – Peritoneum opened but no gas found Distension was then partly relieved by stomach tube. Abdomen closed with 4 deep Through and through sutures. Condition after operation amazingly good. Pulse not good. Post operatively to have nothing by mouth for 8 hours. Subcutaneous saline 4 hourly. 2 am. To have first feed. Glucose ½ Normal saline 3ī. Took feed well. Then Nestles 1:10 3ī 4 hourly.

21.4.41 – Condition quite satisfactory. Colour good. Abdomen not distended. Taking feeds well. Having subcutaneous & rectal salines No vomiting B.N.O.

22.4.41 – Satisfactory – Taking feeds well. One small vomit at night. B.O.

23.4.41 – Not so well today – colour poor Bluish grey round mouth – Fontanelle not sunken. Pulse quite good. Vomited once. Stools loose and frequent. Blood Transfusion 75 cc. Glue saline 40 c.c. 10 pm. Condition slightly improved. HB 68%

24.4.41 – a slight improvement in general condition – Does not look so grey today. Taking feeds quite well. Stools rather loose and green.

25.4.41. – Slight improvement. Still has occasional vomit – Face not so grey or pinched Has quite a lusty cry. 10 pm. Does not look so well tonight. Fontanelle slightly sunken Stools still frequent and green.

26.4.41 – General condition appears worse today. Slow with feeds. Green loose stools during night – Continuous drip started

27.4.41 – Died.

PATHOLOGY REPORT

NAME MICHAEL M AGE 8/52
WARD I PROF. MCNEIL P.M. 28.4.41
DIED 27.4.41

EXTERNAL APPEARANCE The body was that of a small emaciated male infant. There was a recent surgical incision in the epigastrium not yet fully healed. Abdomen was a little full but not tense.

ABDOMEN - Peritoneal sac. There were unorganised fibrinous adhesions between the pyloric portion of the stomach and the inferior surface of the right lobe of the liver. Also between the transverse colon and stomach, and between the omentum and anterior abdominal wall at the site of the incision. There was also a little fibrinous exudate on the surface of the spleen but the rest of the peritoneal sac was quite healthy and the serous membrane was smooth and glistening.

Stomach was moderately dilated and rather thick walled. The pyloric canal was greatly hypertrophied and very hard. Rammstedt's operation had been performed. The incision in the stomach was covered with rather purulent looking fibrinous exudate and was adherent to the liver as described. Two stitches had been inserted in the mucous membrane at the proximal end of the incision. From the mucous aspect a minute nick

in the mucous membrane was still detectable but it was partly healed and there was no leak that could be seen.

Intestine showed some patches of congestion especially in the ileum but nothing of much significance.

Liver, Spleen, Kidneys and other organs showed nothing except a somewhat anaemic appearance.

THORAX - Serous sacs were healthy

Lungs were congested and oedematous Pneumonia was not obvious but there might have been a little at the extreme base.

Upper respiratory passages, mouth Pharynx and oesophagus were healthy.

Heart showed nothing to note.

SUMMARY

Congenital hypertrophic stenosis of the pylorus; Rammstedt's operation.

Slight localised peritonitis in upper abdomen in relation to site of pyloric operation

No definite evidence of gastro-enteritis

Terminal pulmonary oedema.

Signed A.R. MacGregor.

BACTERIOLOGICAL REPORT

Faeces. - No organisms of dysentery or enteric groups isolated.

NAME MACKIE GILBERT ADDRESS 13 BRIANBANK TERRACE
AGE 6/52 BIRTHDAY 8.3.41.
ADMITTED 18.4.41 RECOMMENDED BY Dr. BRUNELL
DISEASE PYLORIC STENOSIS
RESULT RECOVERY

SUMMARY

Family

Father 36 yrs
Mother 35 "
Children
♀ 2½ yrs
♂ 6/52

PRESENT ILLNESS – Vomiting for 9 days.

Breast fed baby ♂. Birth weight 7lbs. Gained 1lb weight in the first week, and 9oz weekly for next 3/52. Has taken feeds well since birth. No vomiting until 9 days ago – aet. 4½ weeks. Then he started vomiting after 2-3 feeds, either directly or within an hour – practically the whole feed. During the last 6 days he has vomited after every

feed – vomit being very forcible – Takes feeds speedily at first. Up to recently has been very good & slept between feeds now he cries often for an hour before the feed is due. The mother does not think he is thinner now. Bowels have been loose mustard action since birth until 6 days ago, when they became constipated. Has had only 2 motions within the last 4 days and has been given laxatives.
Blood stained vomit 3 days ago – occult blood.

FAMILY HISTORY – Healthy.

GENERAL CONDITION – well nourished healthy looking baby.

STRUCTURE – Head well shaped. Fontanelle admits 2 fingers – normal tensity Thorax normal contour – no beading. Limbs proportionate.

NUTRITION – well nourished – subcutaneous tissues have good
No obvious loss. Face not pinched

SURFACE – Skin smooth and elastic – healthy pink colours – Mucous membranes moist and good colour. Tongue moist & clean. Eyes glistening. Hair healthy.

MUSCULAR CONDITION – muscle tone good

MENTAL CONDITION – Not unduly wakeful & irritable Noisy – just before feeds.

AILMEMTARY SYSTEM – Abdomen moves on respiration
Abdominal muscles very active.
No peristalsis seen.
No tumor felt.
Liver and spleen not palpably enlarged.

RENAL SYSTEM Kidneys not palpable
Urine – Alk. Alb. Sugar.

RESPIRATORY SYSTEM Chest expansion good.
Percussion resonant.
Auscultation B.S.
No accompaniments.

CARDIO-VASCULAR SYSTEM Pulse regular.
Apex beat within normal limits
Heart sounds closed.

CENTRAL NERVOUS SYSTEM No neck rigidity
Knee jerks present & equal.

PROVISIONAL DIAGNOSIS Pyloric Stenosis

TREATMENT + PROGRESS

18.4.41 – Vomited during 2 o'clock feed. Retained 1 3/4 oz
Vomit fairly forcible.

19.4.41 No vomiting during night. T.R. 6 drs.
No peristalsis seen.

20.4.41 Faint peristalsis seen. Projectile
vomiting. T.R. 6 drs.

21.4.41 Very little T.R. but thick – B.N.O. Has
had one projectile vomit Peristalsis seen.

22.4.41 Large thick T.R. 10 dr. Two projectile
vomits. Takes feeds eagerly. One small
constipated motion.

23.4.41 Looks thinner today. Starting Eumydrin
m̄ t.d.s. Vomited twice – projectile.

24.4.41 Has not looked well today. Pale and eyes
look sunken. Would not suck at

2 o'clock feed. Subcutaneous saline given. Seems very collapsed.
Took 6 o'clock feed slightly better.

25.4.41 Slight improvement in general condition since yesterday. Large gastric residue. Not eager for 10 a.m. feed but took it better than feeds yesterday.
To have subcutaneous saline B.D.

6 P.M. Rammstedt's operation - miss Herzfeld
Luminal 3/4 grs. Ethylchloride & Ether

Right paramedian incision. Considerable amount of subcutaneous fat. Firm hernia found, about 3/4 in. in length. Peritoneum closed c continuous catgut. Baby became rather restless during closure of peritoneum and general anaesthetic was given. Muscle and sheath closed with continuous catgut. Skin sutured c continuous silkworm gut.
Baby rather pale and pulse poor immediately after operation. 1/2 cc given. Recovered well within half an hour.

26.4.41 General condition very satisfactory. Taking glucose & 1/2 normal saline well. No vomiting. Starting breast milk this morning.

27.4.41 Satisfactory. Taking feeds well. Has not been put to breast yet. Bowels normal.

28.4.41 Taking from breast 3 hourly, fairly well. Not very eager at night.

29.4.41. Feeds today 4 hourly. Taking very well. Has gained a little weight

NAME LEISHMAN ALISTAIR ADDRESS 84 MARCHMONT Rd. ED.
AGE 2½/52 BIRTHDAY 21. 3. 41
ADMITTED 7. 4. 41 RECOMMENDED BY Dr. HENDERSON
DISCHARGED- DEATH 15. 4. 41.
DISEASE PYLORIC STENOSIS

RESULT OPERATION DEATH SECTIO
SUMMARY ÷ cause of death - peritonitis

FAMILY	HOME
FATHER	36
MOTHER	35
CHILDREN	2 ½/52.

PRESENT ILLNESS
F.T.S.D. - Healthy baby - B.W. 6lbs 11¾ oz. Born in Simpson maternity. No cyanosis. No fits Breast fed for 1 week. Not enough milk - No vomiting during first week. Now on Nestles 1-10 ½ oz 2 hrly. During last 6 days vomiting frequently - projectile, but no peristalsis seen. Hungry for feeds. Bowels gradually becoming more constipated. No motion for last 2 days. Losing weight this last week. Fresh baby.

No family history

GENERAL CONDITION — Age 2½/52

WEIGHT 5lb 10z
HEIGHT 19"
T 98
P 136
R 36

an active lively little baby.

Structure – Small but well proportioned. Head good shape. Fontanelle widely open – admits 5 fingers. Thorax and limbs proportionate.

Nutrition – Rather a thin baby with slight loss of subcutaneous tissue.

Surfaces – Skin elastic – good colour umbilicus – some blood stained discharge. mucous membranes moist – good colour. mouth clean. Eyes bright.

Musculature Not greatly developed.

Mental condition – Lively baby.

Alimentary System – abdomen moves on respiration. No visible peristalsis No tumours felt but R.F. rectus rather rigid. liver + spleen not enlarged.

Respiratory System – Chest moves freely. Percussion note good. auscultation. B sounds. vesicular – No accompaniments

Cardio vasc. System – Pulse regular Heart sounds closed.

Renal System – Kidneys not palpable
Urine: –

Central Nervous System – Pupils react
Knee jerks present.

Provisional Diagnosis – Pyloric Stenosis.

TREATMENT + PROGRESS

8.4.41 Has taken feeds well since yesterday. No vomiting. No peristalsis seen. Gastric Residue 8 oz
9.4.41. Has had one vomit but not projectile. No peristalsis seen. Has only had one stool since admission. Gastric Residue 8 oz.
10.4.41. Gastric Lavage 5 oz. Two vomits – projectile Has lost 2 oz weight.
11.4.41. Peristalsis seen this morning. Small tumour felt. General condition good. Three vomits – projectile. 3 stools.
For operation tomorrow. Subcutaneous Saline 75 c.c.
12.4.41. Gastric Lavage – small residue 2 oz.
Subcutaneous saline 90 c.c. Luminal ½ gr.
Rammstedt's operation. Miss Mackay:
Anaesthetic – Novocain.
Right paramedian incision. Small but very hard white tumour found. Peritoneum stitched with continuous suture. Three interrupted sutures in post rectus sheath. Muscle and skin layers closed with continuous silk.
Condition after operation very good.
13.4.41 – Very satisfactory. No vomiting.
Taking glucose & Nestles
14.4.41 – Rather pale but has never had much colour. Pulse not good. Rather slow with afternoon feeds. Abdomen distended with

wind but became relieved later.
11.30 p.m. Pulse good. abdomen less distended
Vomited after 9 o'clock feed.
15.4.41. 3 a.m. Suddenly collapsed + died.

POSTMORTEM FINDINGS.

Post operative peritonitis following Rammstedt's operation

SUMMARY

A case of pyloric stenosis with early onset and short history. While breast fed for first week there was no vomiting but within a week of artificial feeding vomiting began. The history then soon became that of a typical pyloric. While in Hospital the baby was not given enemydrex. The vomit became projectile 3 days after admission and peristalsis was then seen. Rammstedt's operation was done 5 days after admission. The condition of the baby was quite satisfactory. Two days after the operation baby was taking feeds reluctantly and it was noticed that the abdomen was rather distended. His death during the night, however, was sudden and unexpected. At post-mortem fairly extensive peritonitis was found.

NAME ALISTER LEISHMAN AGE 3 WEEKS

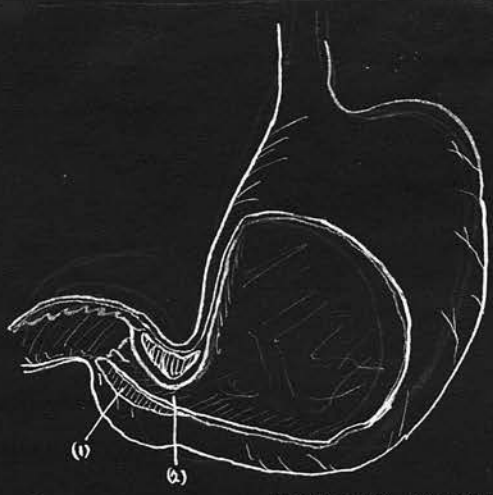
DIED 15·4·41 P.M. 15·4·41

EXTERNAL APPEARANCE The body was that of an emaciated and undersized male baby. The umbilicus was healed and healthy. The paramedian stitched surgical incision was present in the epigastrium.

ABDOMEN – Peritoneal cavity contained a considerable amount of semi-purulent fluid. Inflammatory exudate was present between the adjacent aspects of the liver and stomach, and in the region of the spleen. The anterior abdominal wall in the area of the incision was oedematous and congested and adherent to underlying mesenteries, and related peritoneum.

Stomach was slightly distended with yellow curdy contents. Cardiac opening was normal. The pylorus was much thickened. Rammstedt's operation had been performed. There seemed to be no actual leak of stomach contents but there had been haemorrhage into the layers of the stomach at the upper posterior end of the incision, and the mesenteries on its inferior aspect were exceedingly oedematous and inflamed. The duodenal mucosa was much congested but showed no actual ulceration. The mucous membrane of the rest of the intestinal canal was also much congested. The whole of the intestine was very friable, and in some parts oedematous

CONGENITAL HYPERTROPHIC PYLORIC STENOSIS.



(1) HYPERTROPHY OF CIRCULAR MUSCLE FIBRES.

(2) FOLD OF REDUNDANT MUCOUS MEMBRANE.

DISCUSSION

ETIOLOGY

In this short series of six cases it will be noted that all are boys. In series dealing with large numbers of cases such as that of Rammstedt where in 200 cases the proportion of boys to girls was 10 – 1.

The disease is usually one of the first born and in this series it occurred in first born in 70% of cases, and in second born in the remaining cases. In this respect it conforms to the general rule that this congenital abnormality is more frequent in first born children than in subsequent ones.

There is little evidence to suggest a hereditary factor at work.

PATHOLOGY + PATHOGENSISES

The question of the origin of muscular hypertrophy in this disease and its relation to pyloric obstruction are still matters of dispute.

The hypertrophy affects mainly the circular muscle layer of the pyloric region of the stomach, the longitudinal muscle to a less extent. According to Fraser, the actual circular pyloric sphincter ring is not included in hypertrophy. The hypertrophy takes the form of a fusiform, gristly swelling, an inch or more in length, of pale colour and reduced vascularity. The sub-mucous coat is usually increased in thickness, and the mucosa is squeezed

into folds which still further occlude the narrowed lumen. Proximally, the overgrowth lessens gradually to normal thickness at the incisura angularis; distally, it terminates abruptly at the pyloric ring. Frequently the pyloric swelling projects into the first part of the duodenum with a covering of duodenal mucosa, very much as the os uteri projects into the vagina. The projection into the duodenum, with the "duodenal fornix" around it, is a source of danger in the operative treatment.

Numerous theories of pathogenesis have been elaborated, but none of these theories attempts to explain why the patient is a boy in 9 cases out of ten, or why the majority of cases are in first born children. In only six per cents of cases is there a family incidence. It even remains doubtful whether the hypertrophy is truly congenital. In most cases, the child is born healthy, and thrives well for a week or two after birth. Symptoms of obstruction do not arise until some weeks after birth. On one or two occasions recently the condition has, however, been found in a still-born, premature child.

Most modern theories of the pathogenesis of congenital pyloric stenosis are based on the original theory of Dr John Thomson - "pre-natal incoordination with post-natal hypertrophy" Thomson maintained that in

the normal child there was required, even in utero, a certain amount of co-ordination at the pylorus for the passage of swallowed amniotic fluid. Thomson believed the prime cause of hypertrophic stenosis to be a loss of pyloric co-ordination in the foetus. Pyloric inco-ordination resulted, according to Thomson, in an ill-timed, abnormal, forcible, and prolonged contraction of the pyloric muscle. Thomson believed, on the authority of Hunter, that the power to hypertrophy in response to overaction was a property of all muscle. He believed therefore that pyloric inco-ordination before birth was followed by pyloric hypertrophy after birth.

Fraser blames a sympathetic-parasympathetic imbalance at the pylorus in the direction of relative sympathetic overactivity, with consequent interference at the gastric evacuation. According to Fraser, the inco-ordinate sphincter is not itself hypertrophied. The antral muscle hypertrophies in an attempt to overcome pyloric spasm. In cases of mechanical occlusion of the duodenum at birth, the antral wall may be almost as hypertrophied as it is in hypertrophic stenosis.

A theory has recently been elaborated to explain the condition rather as a developmental failure. Wernstedt has pointed out that in the

NAME	PLACE IN FAMILY	AGE AT ONSET.	LENGTH OF HISTORY	BIRTH WEIGHT.	WEIGHT ON ADMISSION	RESULT.
DAVID THOMSON.	1.	3 WEEKS.	10 DAYS.	8 lbs 5 ozs.	6 lbs 4 ozs.	RECOVERY.
THOMAS WHITE.	1.	14 DAYS.		6 lbs. 8½ ozs.	8 lbs 3 ozs.	RECOVERY.
KEITH BELL.	2.	17 DAYS.	4 DAYS.	6 lbs 10 ozs	5 lbs 14 ozs.	RECOVERY.
MICHAEL MAGUIRE	1st. Child. ONE OF TWINS.	5 WEEKS.	4 DAYS.	5 lbs · 3 ozs	5 lbs 10 ozs	DEATH.
GILBERT MACKIE	2.	6 WEEKS.	9 DAYS.	7 lbs.	8 lbs 6 ozs.	RECOVERY.
ALISTAIR LEISHMAN	1	2½ WEEKS.	6 DAYS.	6 lbs 11¾ ozs	5 lbs 10 oz.	DEATH.

focus the pyloric portion of the stomach is relatively thick-walled, out of proportion to the calibre of its lumen, and he has suggested that this disproportionately thick wall may be maintained in the pars pylorica until after birth in children who suffer from (pyloric) hypertrophic stenosis, just as this maintained normally even after full development in certain lower orders - the edentata, for example.

CLINICAL FEATURES

Since successful treatment depends upon detection of pyloric obstruction at an early date, diagnosis should not now be delayed until the late stages when projectile vomiting is almost continuous, and the child dehydrated and cachetic. Vomiting followed by constipation, arising a week or two after birth should raise the strong suspicion of congenital pyloric stenosis. In this series the average age of the child at the onset of vomiting was seventeen days and the average duration of vomiting before child was admitted to Hospital was seven days. Occasionally diarrhoea occurs, and when it does occur the prognosis is bad. In one of the two deaths in this series diarrhoea was a marked symptom. The cause of this diarrhoea is not known. Since the introduction of eumydrin it appears to be more common. Visible peristalsis and a palpable tumor are not, as a rule, present before the sixteenth or eighteenth day, but they should always -

ABDOMINAL SIGNS.

	VISIBLE PERISTALSIS.	PALPABLE TUMOUR.	ENLARGEMENT OF LIVER.	ENLARGEMENT OF SPLEEN.
THOMAS WHITE	+ GASTRIC PERISTALSIS.	NEG.	NEG.	NEG.
DAVID THOMSON.	NEG.	NEG	NEG.	NEG.
KEITH BELL.	+ GASTRIC PERISTALSIS.	PALPABLE.	"	"
MICHAEL MAGUIRE.	NEG.	NEG.	"	"
GILBERT MACKIE.	"	"	"	"
ALISTAIR KEISHMAN.	"	"	"	"

be sought. In this series I found that gastric peristalsis were present in two cases and a palpable tumor in only one.
An important practical point in the detection of visible peristalsis is to avoid prolonged exposure of the infants' abdomen to the air. A small feed is given, and then a little later the abdomen is uncovered and examined. Visible peristalsis takes the form of a swelling the size of a golf ball arising under the left costal margin and passing across the abdomen to disappear just beyond the midline. At the point of disappearance of the peristaltic wave, an attempt may be made to palpate a pyloric tumour. Sometimes two or three peristaltic waves may be observed together.

AIDS TO DIAGNOSIS

Radiological examination has proved helpful in doubtful cases. Gastric dilatation may be obvious on the screen, and it may be an hour or more before the barium passes the pylorus. A residue of barium may remain in the stomach for as long as six hours after the meal is taken. The stomach above the obstruction presents, as a rule, a curious cone-shaped termination towards its pyloric end, which is displaced some way to the right.
No less efficacious than radiological examination is simply the passage of a stomach tube four hours after a normal feed. In pyloric stenosis, as much as fifty per cent. of the feed may be recovered.

In late cases of the disease, the child passes into a state of dehydration, chloride depletion, and alkalaemia, and there is a terminal elevation of the non-protein nitrogen of the blood. The degree of dehydration and demineralisation is indicated by the dryness of mouth and skin, hollowness of the cheeks and temples, the amount of urine, and the chloride content of urine and blood.

DIFFERENTIAL DIAGNOSIS

Gastric catarrh, pylorospasm and enteritis must be excluded. These are due, as a rule, to unsuitable diet, and are no commoner in boys than in girls. In all these conditions there is no accumulation of food in the stomach, and peristalsis is not observed. In enteritis, diarrhoea accompanies vomiting, as a rule, but it should be remembered that occasionally diarrhoea may occur in cases of congenital pyloric stenosis. Congenital narrowing of the duodenum, valvular obstruction of the duodenum, duodenal adhesions, and other forms of congenital duodenal obstruction give vomiting from the day of birth, as a rule, the vomitus being bile-stained. The constipation and projectile vomiting of early intracranial disease have sometimes been mis-diagnosed as congenital pyloric stenosis

TREATMENT

In most centres an attempt is made to employ a combination of medical and

surgical measures in the treatment of pyloric stenosis. Probably it is safer to make a rule to operate in all cases early rather than to continue conservative treatment persistently over a prolonged period. Rammstedt records that in the Dusseldorf experiment 92 cases were treated conservatively with a mortality of 18.8%. In the five years after 1928 – 110 consecutive cases were treated by early surgery with a mortality of 3.6%

CONSERATIVE TREATMENT

The protagonists of this method, who have been getting the worst of it during the past few years, will take heart from the reports of Dodds & Mackay on their reports of their experience with eumydrin i.e. atropin, methyl nitrate. The use of this drug which has about half the anti-spasmodic action, and about 1/50 of the toxicity of atropin, was originally suggested by Wiener some fifteen years ago. In 1935 Svensgaard of Copenhagen compared her results in sixty one cases treated with eumydrin, with those of surgery and of medical treatment with atropin. She concluded that eumydrin was more effective and less toxic than atropin but that either gave better results than surgery. There was only one death in her eumydrin series but workers in Britain Germany and Sweden have been less fortunate. Dodds & Mackay of London have each treated forty cases

and have each had five deaths – a fatality of 12.5%. Compared with this Tompson & Painsford treated 209 cases surgically, mostly in Hospital, with a fatality of 13.4%. Ramenstedt himself as has been mentioned above had a mortality rate of 3.6%

The technique of the eumydrin treatment is to be carried out for as long as the child gains weight - small feeds to begin with gradually working up to an adequate diet is advised by Dodds. The stomach is emptied by lavage a little before each feed so that no residue collects in it. Care should be taken to use for lavage saline, as was used in this series, or boric solution, because there is present, as a rule a degree of alkalaemia. This essential in these children to overcome dehydration as quickly as possible for serious intoxication may result from the giving of eumydrin to a dehydrated child. Dodds and Buengaard both give subcutaneous salines until there is a satisfactory passage of urine. However this administration of sub-cutaneous saline is not universally approved. Mackay is convinced that too high a fluid intake reduces both effectiveness of the drug and the baby's appetite. Except while there is obvious dehydration she therefore advises fluids by mouth only and limits them to 3 ounces per pound of body weight in the first 24 hours, and thereafter gives only as much as the baby

really wants. The eumydrin 1–10,000 of water is given half an hour before each feed - beginning with ½ c.c. and working up to 2 c.cs.

TOXIC SYMPTOMS Though less common than with atropin do arise, especially fever and abdominal distension and must be an indication for omitting at least one dose of the drug. The watery solution of eumydrin does not keep well and must be made each week. This difficulty is overcome by Wallgren's method. He uses a .6% alcoholic solution which is stable. This solution is given in drop doses on the tongue. It need be given only twice a day. The case should be completely reviewed at the end of a week and if no decisive improvement is evident, operation is indicated.

SURGICAL TREATMENT Here there is a diversity of opinion. There are those, such as Rammstedt who advise operation in all cases as soon as diagnosed the rational of this method being that there is no evidence from the appearance of a child as to whether or not it will respond to conservative treatment - i.e. eumydrin. Valuable time may be lost and the child's condition deteriorate thus making operation a hazardous undertaking carrying with it a high mortality. Most clinicians would agree a conservative treatment should be continued for 8 or 10 days in the

average case, and if after this period no gain in weight is recorded operation should be performed.

PRE-OPERATIVE TREATMENT

Subcutaneous saline 80 c.c. 3/4 hours before operation and 80 c.cs again 1 hour before operation. Luminal 1/2gr 2-3 hours before operation.

OPERATION

The Rammstedt operation is now universally used. Before this operation was perfected the gastro-enterostomy was performed with a high mortality. As in all abdominal operations in infants the patients limbs are swathed in cotton wool and he is stretched over an electric hot blanket on an aluminum plate to whose corners his wrists and ankles are tied.

ANAESTHESIA

In all this series the same anaesthetic was used - that was local anaesthesia with novocain. At the same time a nurse stands at the infants head and allows him to sip from time to time the finger of a rubber glove dipped in glucose water. An argument is sometimes raised against local anaesthesia is that anaesthetic infiltration of the dehydrated tissues of the abdominal wall makes for slow healing, and increases the liability to post-operative bursting of the abdominal wound - a complication to which pyloric babies, are in any case prone.

The abdomen is opened by a right paramedian incision. The pylorus is palpated and drawn into the wound by a blunt hook or forceps. When the tumour is inspected a bloodless area is found on the antro-superior surface. A longitudinal incision is made down through the muscle coat towards the operator. Care should be taken to carry this incision as far proximally as the swelling extends, but distally only as far as the pyloric vein. If it is carried further, the "mucosal fornix" which may surround the distal extremity of the overgrowth is likely to be opened. When the incision has been made through the muscle, a blunt dissector is insinuated under each of its edges, so that the mucosa, widely separated from the muscle, bulges freely forwards, and the mucosal folds are undone. With the blunt dissector also any remaining muscle fibres left undivided beyond the pyloric vein are broken through. If the stomach is now gently squeezed, gas should pass readily through the patent pylorus, and if the "duodenal fornix" has been opened a leakage of gas will indicate the site of the perforation, which may be immediately and meticulously closed by two layers of sutures. When the muscle division is complete the pylorus is returned to the abdomen, and no attempt is made to close the gap in the muscle coat. Rupture of the unprotected mucosa never occurs.

POST OPERATIVE TREATMENT

The post operative period is most important. The great value of breast feeding during this period should be stressed. Frequent small feeds should be given of some readily assimilable food such as peptonised milk. Nothing should be given by mouth for 4 hours after the operation. It was our practice to give 2 drs of glucose hourly for 4-6 hours and thereafter 1oz peptonised milk may be prescribed at 2 hourly intervals. The amount of the feed and the length of the interval are gradually increased until by the third day the infant is receiving a feed appropriate to its age and weight.

PROGNOSIS

The outlook in congenital pyloric stenosis depends on the nutritional state of the infant when the operation is performed. Barrington Ward has shown that the heavier of the child at the time of operation the greater the prospect of cure. In most centres the mortality figure is 12% - 25% though in this short series of six consecutive cases the mortality rate was 33%. In general it may be said that the surgeon's mortality figures are best where the operation is done early. In centres where only the worst cases come to the surgeon and where conservative treatment is continued obstinately in spite of loss of weight

the mortality of the Rammstedt operation must be heavy. Post operative refeeding should be carried out in all cases in order to cut down the risk of gastro enteritis. In private practice there is practically no mortality in surgical treatment of pyloric stenosis.

POST OPERATIVE COMPLICATIONS

Enteritis is the most dreaded of these. The cause of this is probably as follows – it is due to the sudden release of hydrochloric acid into the intestinal mucosa which is not accustomed to it and causes intense irritation. As well as this it seems possible that there is a bacterial infection superadded. One of the two deaths in this series was due to severe post operative gastro-enteritis. Peritonitis was the cause of death in the other case. This patient was a poor operative risk – had lost much weight – and unfortunately at operation the mucosal fornix of the pylorus was nicked. Some peritoneal soiling resulted and at post mortem a peritonitis of the upper peritoneal cavity was found.
Hyperpyrexia, vomiting, haemorrhage are other rarer complications, none of which were encountered in this series.

SUMMARY

From this series we draw the following conclusions: —

1. Congenital pyloric stenosis is a

disease predominating in male children first born. The onset of symptoms is from 17–20 days after birth.

2. As regards physical signs in only one of our cases was the tumor palpable and in only two was gastric peristalsis seen yet when the abdomen was opened in all cases a very definite tumour was present.

3. Regarding Treatment we adopted the operative procedure as soon as diagnosis was evident. The mortality rate was 33% which is rather higher than that based on a larger series. Of cases done in this Hospital when it was found to be 20%.

Ultimate prognosis definitely governed by the weight of the child when it goes to operation. Two deaths in our series were in infants in whom the diagnosis had been delayed and in consequence they had suffered from loss of weight.